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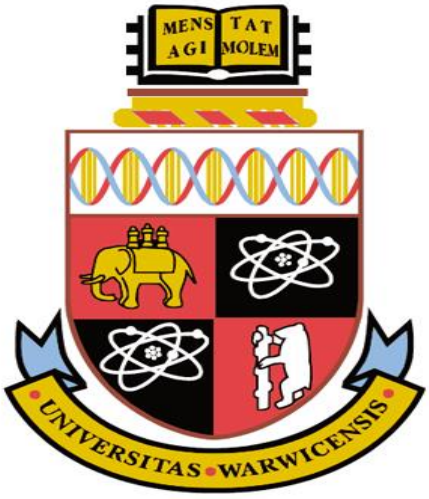

Essays on Institutional Ownership and Tax Avoidance

by

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Thesis

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Declaration

I declare that this thesis is my own work and any material from this thesis has not been submitted for the award of any degree to any other University. I have presented chapters 2, 3 and 4 of this thesis in several international conferences and received many helpful comments. A list of seminar presentations and international conferences is provided below:

- Cass Business School (2019);
- European Accounting Association (2019) - Annual Meeting, Paphos (Cyprus);
- Free University of Bozen-Bolzano (2019) - Bolzano (Italy);
- Norwegian School of Economics (2019) - Bergen (Norway);
- University of Manchester (2019);
- American Accounting Association (2018) - Annual Meeting, Washington D.C.;
- European Accounting Association (2018) - Annual Meeting, Milan (Italy);
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Abstract

The accounting and finance literature views institutional investors, such as pensions and insurance companies, investment advisors and banks, hedge funds and mutual funds, as a heterogeneous class of shareholders with different incentives and abilities to monitor corporate management. Chapter 2 of this thesis focuses on the corporate governance role of one such shareholder type, namely foreign institutional investors. One view is that larger ownership levels by foreign institutions could lead companies to myopic decisions in order to boost short-term investment returns. The proponents of this view argue that foreign institutional investors could prompt corporate managers to prioritise short-term earnings over long-term growth, thereby leading companies to short-termist strategies. However, foreign institutions are arguably better positioned to act as efficient monitors of managerial decisions in their investee firms. Due to their independence, they can undertake a more effective monitoring activity since their ties with local business actors, such as managers, governmental authorities and communities, are likely lower relative to their domestic counterparts. In addition, their international expertise and higher degree of financial sophistication makes them better suited to understand growth opportunities of their portfolio firms.

In chapter 2, I examine the effects of foreign institutional ownership on corporate tax planning using an international sample of more than 26,000 firms. If foreign institutions are pure profit-maximizers, they would forego the risks of reputational loss, payments of additional taxes, penalties and interests if a company's tax strategy is later considered abusive and encourage the adoption of a more aggressive tax avoidance approach to boost short-term after-tax earnings. In contrast, I argue that foreign institutional investors favour a more balanced tax planning approach that trades off costs and benefits of tax avoidance. Results of chapter 2 are consistent with the latter hypothesis. They provide evidence that foreign institutions act as effective monitors by leading corporate management to select a tax avoidance level similar to the tax position of the company's peers and therefore makes it less likely to attract regulatory and public scrutiny since it does not stand out from other firm peer levels. Results also show that this effect is more pronounced for larger companies, pointing to a political cost interpretation of my findings.

Chapter 3 of this thesis focuses on the role played by index-tracking institutional investors in corporate governance and transparency. Indexed institutions are generally

characterized by passive trading strategies, based on an index-benchmarking activity, and low expenses. Some studies claim that this class of investors exert limited monitoring over corporate management because their portfolios include a large number of company stocks and their resources available for monitoring are scarce. In contrast, other studies show evidence consistent with indexed institutions operating as active owners. According to this stance, indexed institutional investors have the incentive to undertake active monitoring over managerial decisions due to their long-term investment horizons linked to index reconstitutions. In chapter 3, I examine whether indexed institutional ownership is associated with greater transparency and information production related to companies' geographic operations. I find that larger shares of ownership by indexed institutions are associated with greater geographic transparency only in companies that lead most of their operations in tax haven countries and have more entrenched corporate managers. This result is consistent with a view of indexed investors trading off costs and benefits of monitoring by more actively engaging, selectively, with those companies that are more exposed to information asymmetries and governance problems.

Besides external sources of financing, companies can use internally generated funds to finance their activities. One way for companies to generate capital internally is by taking advantage of tax planning opportunities. Reducing tax payments leads to higher tax savings and, presumably, larger cash balances. Yet, companies engaging in tax avoidance incur the risks of reputational loss, additional payments of taxes, interests and penalties if the chosen tax strategy is later ruled improper. In chapter 4, I examine the relation between tax avoidance and firms' labour investments. Consistent with the argument that risks and uncertainties related to tax avoidance make firms more cautious when investing, I provide evidence that firms with low effective tax rates, my proxy for tax avoidance, undertake sub-optimal labour investments relative to the level justified by the firms' underlying economic fundamentals and industry medians. I find this effect using a quasi-natural experiment around Ireland's statutory corporate tax cut of December 1997. More importantly, I find my result to be more pronounced in sub-samples of firms exposed to greater tax risks and uncertainties, which is consistent with the view of firms withholding their hiring decisions in response to potential reductions in cash flows and shareholders' wealth.

Abbreviations

ASC	Accounting Standard Codification
AUM	Asset under management
CEO	Chief executive director
CFO	Cash flow from operations
DID	Difference-in-differences
ETF	Exchange Traded Fund
ETR	Effective tax rate
FTSE	Financial Times Stock Exchange
GAAP	Generally Accepted Accounting Principle
G-index	Governance index
GARP	Growth at a reasonable price
IFRS	International Financial Reporting Standard
IO	Institutional ownership
IRS	Internal Revenue Service
IV	Instrumental variable
LSI	Labour skill index
M&A	Merger and acquisition
MSCI ACWI	Morgan Stanley Capital International All Country World Index
NBIM	Norges Bank Investment Management
OECD	Organization for Economic Co-operation and Development
PP&E	Property, plants and equipment
PSM	Propensity score matching
RDD	Regression discontinuity design
R&D	Research and development
SEC	Security Exchange Commission
S&P 500	Standard & Poor's 500
SFAS	Statement of Financial Accounting Standard
SIC	Standard industry classification
SSGA	State Street Global Advisor
UTB	Unrecognised tax benefit
WRDS	Warthon Research Data Service

Chapter 1

Introduction

1.1 Background

Ownership structures of publicly listed companies have experienced substantial changes over the last two decades. Dispersed and globalized ownership models, typical of companies of the Anglo-Saxon world, are progressively replacing concentrated ownership models, historically more common in continental Europe and Asia, where corporate control is in the hands of family members or states (La Porta, Lopez-De-Silanes, and Shleifer 1999; Ferreira and Matos 2008). Similarly, traditional shareholder engagement related to monitoring activities of corporate management is moving towards more passive, low-cost, index-tracking trading strategies in which the corporate governance role of shareholders is often limited to voting according to pre-determined voting policies or recommendations issued by proxy advisory firms (Gillan and Starks 2000; Iliev and Lowry 2015).

Institutional investors are agents of these changes. Institutions, such as pensions and insurance companies, investment advisors and banks, hedge funds and mutual funds, constitute an heterogeneous class of investors with portfolios built primarily around bonds and equities. With nearly $100 trillion of assets under management (AUM) as of 2013 (The World Bank 2015; OECD 2016), institutional investors represent an important source of capital and are among the largest shareholders of publicly listed companies in both developed and developing economies.

Institutional investors also play a central role in corporate governance. Their active monitoring and their threat of exit can discipline corporate management to act in a way that maximizes shareholders' value (Tirole 2001). For example, Brav, Jiang, Partnoy, and Thomas (2008) present empirical evidence that companies targeted by hedge funds experience greater CEO turnover and increases in payouts and performance after the announcement of an active campaign (i.e. Schedule 13D filing). In contrast, a theoretical paper by Edmans (2009) shows that investors holding significant shares of ownership (i.e. blockholders) can improve firm value using the

threat of selling their shares to discipline self-interested or entrenched corporate managers.

One view is that all institutional investors promote myopic investments in their portfolio firms to boost short-term investment returns. Following this stream of thought, regulators and policy makers have expressed concerns about the increasing stock ownership by active investors. For example, a report released by The World Bank (2015) shows that institutions, such as pensions and mutual funds, tend to invest in short-term assets, adopt herding behaviours and act pro-cyclically during crises. In one high profile case, the then President of France, Jacques Chirac, publicly complained that foreign mutual funds targeting French companies demanded substantial job cuts simply "to safeguard the investments benefits of Scottish widows and California pensioners" (The New York Times 2000). In Germany, the chairman of the Social Democratic Party, Franz Müntefering, compared the increasing stock ownership by short-term oriented, activist hedge funds and private equity firms to an invasion of "locusts" stripping targeted companies' assets (The Economist 2007).

However, the heterogeneity of institutional investors also reflects differences in their monitoring incentives and ability. For example, Bushee (1998) shows that while institutions with high stock turnover and momentum trading (i.e. transient institutions) are associated with a reduction of R&D expenses to reverse a decline in earnings, institutional investors with lower turnover (i.e. dedicated and quasi-indexed institutions) are less likely to adopt such a myopic behaviour. Gaspar, Massa, and Matos (2005) split institutions according to their investment horizon based on stock turnover and find that companies with larger short-term institutional ownership are associated with lower acquisition premiums and lower abnormal returns at the merger announcement and thereafter. In contrast, companies held by institutions with long-term investment horizons receive higher premiums and generate higher abnormal returns following the merger announcement.

Aggarwal, Erel, Ferreira, and Matos (2011) examine the effects of domestic and foreign institutional investors. They provide evidence that institutional ownership is overall positively associated with shareholder-centric corporate governance mechanisms and that, foreign institutions and institutions from countries with strong investor protection export good governance practices in their investee firms. Further, Aggarwal et al. (2011) find that, unlike domestic institutions, monitoring by foreign

institutions is value enhancing. On a similar note, Bena, Ferreira, Matos, and Pires (2017) show that companies with larger foreign institutional ownership document greater long-term investments in tangible, intangible and human capital and experience also increases in innovation output.

Chapter 2 of this thesis contributes to the existing literature by examining the corporate governance role of foreign institutional investors with respect to firms' tax planning policies. If foreign institutions are profit-maximizers, they would forego the risks of reputational loss, payments of additional taxes, penalties and interests if the tax strategy is later ruled improper and adopt a more aggressive tax avoidance approach to boost short-term after-tax earnings. In contrast, foreign institutional investors may favour a more balanced tax planning approach that trades-off costs and benefits of tax avoidance. Results of chapter 2 are consistent with the latter hypothesis. They provide evidence that foreign institutions act as effective monitors by leading corporate management to select a tax avoidance level that is similar to the tax position of their company's peers and is less likely to attract regulatory and public scrutiny because it does not stand out from peer levels. This effect is more pronounced for investors with a long-term investment horizon. Finally, results hold for larger companies only, pointing to a political cost interpretation of my findings.

I find these effects using an international sample of more than 26,000 publicly listed companies from forty-eight countries between the years 2000 and 2016. To mitigate endogeneity concerns, I use two approaches to identify the impact of foreign institutional investors on corporate tax planning policies. First, I take advantage of the elimination of investing limits to Norway's pension funds and insurance companies occurred in 2008 using a quasi-experimental design. Second, I exploit the plausibly exogenous variations of foreign institutional ownership that follows a company's inclusion (and exclusion) into the Morgan Stanley Capital International – All Country World Index (MSCI ACWI) using both instrumental variable (IV) and regression discontinuity (RDD) analyses.

Chapter 3 classifies institutional investors as active or passive based on their trading strategy. Active institutions are characterized by a more direct involvement in monitoring corporate management. They accumulate shares to influence managerial decisions or sell their shares when managers perform poorly. In contrast, passive institutional investors do not buy and sell stocks to prompt corporate changes. Their

trading strategy aims to deliver the returns of a market index (i.e. S&P 500) and is, therefore, characterized by low turnover, diversified holdings and minimal expenses. For this reason, passive institutions are traditionally associated with lower monitoring incentives when investing; raising questions about how effectively managerial activity in the investee firms is being monitored (Bloomberg 2018).

A number of studies suggest that passive investors act as ineffective corporate monitors. On this spirit, Schmidt and Fahlenbrach (2017) present evidence that larger shares of ownership by passive, index-tracking investors are associated with increases in CEO power and fewer appointments of new independent directors. Moreover, companies experience lower announcement returns from M&A activities and director appointments following an increase in passive ownership. On a similar stance, Iliev et al. (2019) find that passive investors undertake low governance-related research, measured by the number of views of a company's SEC filings by investor type, and Bebchuk and Hirst (2019) show that the three largest U.S. passive investors (namely, BlackRock, State Street Global Advisor (SSGA) and Vanguard) tend to avoid involvement in corporate reforms in their portfolios.

Other studies lend support to the hypothesis that passive institutional investors are not "passive owners". For example, Appel, Gormley, and Keim (2016) present evidence that passive institutions improve corporate governance in their investee firms, in that their stockholdings are positively associated with independent director appointments, removal of takeover defences, more equal voting rights and long-term value creation. Similarly, Crane, Michenaud, and Weston (2016) show that companies with larger passive institutional ownership document more generous payout policies, consistent with a disciplinary effect over corporate management. Finally, Boone and White (2015) find that companies generate more information, in the form of management forecasts, and are more transparent, as proxied by the number of analysts' forecasts and liquidity, after an increase in passive, index-tracking, institutional ownership.

Chapter 3 investigates whether indexed institutional ownership is associated with greater transparency and information production related to companies' geographic operations. Results indicate that larger shares of ownership by indexed institutions are associated with greater transparency only in companies that lead the majority of their operations in tax haven countries and have more entrenched corporate managers. This

finding lends supports to the view of indexed investors trading off costs and benefits of monitoring by acting as effective, though selective, monitors in those companies that are more exposed to information asymmetries and governance problems.

I conduct the analysis in chapter 3 using a sample of more than 4,400 U.S. publicly listed companies between the years 1998 and 2016. I use two approaches to provide causal support to my findings. First, I take advantage of the elimination of investing limits in iShares Exchange Traded Funds (ETFs) of 2003 to implement a difference-in-differences (DID) test for the impact of indexed institutional investors on geographic segment disclosure. Second, I exploit the plausibly exogenous variation of indexed institutional ownership around the Russell 1000/2000 inclusion cutoff using both instrumental variable (IV) and regression discontinuity design (RDD) analyses.

Besides external sources of financing, companies can use internally generated funds to finance their activities. One way for companies to generate capital internally is by taking advantage of tax planning opportunities. Reducing tax payments leads to higher tax savings and, presumably, to larger cash balances. Yet, companies engaging in tax avoidance incur the risk of reputational loss, additional payments of taxes, interests and penalties if the chosen tax strategy is later considered abusive[1]. For example, in 2016, Alphabet reached a settlement with the British tax authorities to pay additional taxes of £130 million on revenues earned between 2005 and 2014 and in the same year, the European Commission demanded additional taxes from Apple of €13 billion for its aggressive tax planning (Financial Times 2016).

In a review of the tax literature, Hanlon and Heitzman (2010) suggest that further research should investigate the consequences of tax avoidance on corporate decision-making and address the question of what companies do with the extra cash generated by tax avoidance activities. One view is that companies use the extra cash to increase investments in tangible, intangible and human capital. Taking this stance, a recent study by Shevlin, Shivakumar, and Urcan (2018) shows that firms engaging in tax avoidance are associated with higher capital expenditures and net hiring. At a macro-economic level, this effect partially leads to higher GDP and employment growth.

A different view is that tax avoidance acts as a friction to the investment preferences of corporate management by leading to sub-optimal investment decisions. De Simone,

[1] The OECD (2013) estimates that the loss of global tax revenues from tax planning activities aimed at aggressively avoiding corporate taxes ranges from $100 and $240 billion per year.

Klassen, and Seidman (2018) find that income shifting aimed at avoiding taxes is positively associated with the level of affiliate investments in tangible, intangible and human capital but, negatively associated with the efficiency of affiliate investments. Similarly, Blouin and Krull (2009) present evidence that companies repatriating their foreign earnings under the American Job Creation Act of 2004 document fewer investment opportunities than non-repatriating companies, but larger cash balances and payouts to shareholders.

Based on the above discussion, chapter 4 examines the relation between tax avoidance and firms' labour investments. Consistent with risks and uncertainties from tax avoidance making firms more cautious when investing, chapter 4 provides evidence that firms with low effective tax rates, a proxy for tax avoidance, undertake sub-optimal labour investments relative to the level justified by the firms' underlying economic fundamentals and industry medians. Chapter 4 shows this effect using a quasi-natural experiment around Ireland's statutory corporate tax cut of December 1997. More importantly, results are more pronounced in sub-samples of firms exposed to greater tax risks and uncertainties, which is consistent with the view of firms withholding their hiring decisions in response to potential reductions in cash flows and shareholders' wealth.

Overall, this doctoral thesis contributes to the capital markets research in accounting, with a primary focus on tax avoidance and the role of institutional investors in financial reporting and corporate decision-making. It examines institutional ownership as a determinant of tax planning and geographic segment disclosure in the investee firms as well as corporate hiring policies as consequences of tax aggressive behaviours. More specifically, Chapters 2 and 3 investigate whether monitoring by institutional investors affects managerial tax- and disclosure-related decisions. Chapter 2 breaks down institutional ownership into domestic and foreign components to investigate the effect of each type of institutions on incentives for corporate tax planning. In contrast, Chapter 3 focuses on the association between plausibly passive, index-tracking institutional investors and firms' motives for geographic segment reporting. Finally, chapter 4 empirically explores whether aggressive tax avoidance leads firms to make sub-optimal labour investment decisions and, in particular, to under-hire relative to the level justified by the firms' economic

fundamentals. Chapter 5 concludes and highlights further avenues for research. The next sections summarize each chapter of this thesis.

1.2 Ownership structures and corporate tax policies

In chapter 2, I examine the association between foreign institutional ownership and corporate tax planning using an international sample of more than 26,000 publicly listed companies from forty-eight countries between the years 2000 and 2016. The main source of inquiry of chapter 2 is whether monitoring by foreign institutional investors influences managerial tax-related decisions around the world.

A number of studies support the view of foreign institutions being better able to engage in an independent and objective monitoring over corporate management due to their weaker ties with local businesses and management (Ferreira and Matos 2008, Aggarwal et al. 2011, Bena et al. 2017). In contrast, domestic institutional investors may have lower monitoring incentives as their businesses are more likely to be intertwined with local business actors – such as companies, governmental authorities and communities (Davis and Kim 2007; Giannetti and Laeven 2009).

Taxes represent only a line of cost to institutional investors for their investee firms. Reducing this cost leads to higher after-tax earnings and, presumably, to higher shareholder returns. However, recent studies present evidence that a tax planning strategy leading to tax avoidance can act as a friction to shareholders' preferences (Hanlon and Heitzman 2010; Blouin 2014; Graham, Hanlon, Shevlin, and Shroff 2014; Chyz and Gaertner 2018). That is, companies found to avoid taxes are exposed to reputational losses and payments of additional taxes, penalties and interests, potentially reducing after-tax earnings and shareholder returns.

One implication of this trade-off between costs and benefits is that companies may look to their industry peers for tax planning strategies. On this spirit, in chapter 2, I test two predictions about the effect of foreign institutional ownership on corporate tax planning. The first is that the presence of foreign institutional investors plays a disciplinary role by leading corporate managers to engage in a level of tax planning that is consistent with the average tax position of the company's country and industry peers. The second prediction is that larger and profitable firms are more sensitive to deviations from their country/industry norms due to political costs associated with being perceived as overly aggressive (Watts and Zimmerman 1978; Zimmerman 1983).

The endogeneity of foreign institutional ownership makes it challenging to establish causal relations. Foreign investors may choose to invest in companies planning to reduce their tax rates, or there may be missing factors associated with both foreign institutional ownership and the firm's tax rate. In chapter 2, I address both the omitted correlated variables concern and reverse causality using two methods to isolate a plausible exogenous change in foreign institutional ownership.

First, the elimination of investing limits to Norway's insurance companies and pension funds in January 2008 led to large increases in foreign equity investments by Norway's insurance and pension funds (treatment group) from 2008 onwards but not the percentage of foreign stocks held by Norwegian institutional investors other than pensions and insurances (control group). Taking advantage of this setting, I present in chapter 2 the results of differences-in-differences (DID) analyses. Second, similar to prior studies (Aggarwal et al. 2011, Bena et al. 2017), I exploit the exogenous variation in foreign institutional ownership that follows the addition (and deletion) of companies to the Morgan Stanley Capital International – All Countries World Index (hereafter, MSCI ACWI) using both instrumental variable (IV) and regression discontinuity (RDD) approaches.

Results in chapter 2 show that higher foreign ownership in the current year increases the likelihood of peer tax planning in the following year. Evidence also suggests that higher foreign institutional ownership in the current year is associated with less aggressive tax positions (low or high tax avoidance relative to peer levels) in the next year. That is, this year's foreign institutional ownership is negatively associated with a firm being extreme tax avoider as well as extreme payer the next year. Thus, findings support a symmetrical interpretation of peer planning for tax purposes.

I also develop a political cost hypothesis consistent with Watts and Zimmerman (1978) and Zimmerman (1983). Both papers suggest that large and profitable firms are less likely to be extreme tax avoiders due to political costs associated with being perceived as outliers by the government or their customers. These costs include fines, being governmental and regulatory targets, or having customers shun the products of firms deemed to be overly aggressive in their tax planning. Consistent with this premise, recent evidence by Chen, Powers, and Stomberg (2019) shows that the negative tone of media coverage on tax issues increases with larger and more visible

firms. I present several tests within chapter 2 and find evidence consistent with a political cost theory of tax planning.

Finally, I examine if the monitoring activities of foreign institutions are substitutes or complements to the firms' other governance structures. Results indicate that the effect of foreign institutions on tax planning is stronger for companies with powerful CEOs and with lower incentive-based executive compensation. These findings are consistent with foreign institutions acting as monitors within the firm's corporate governance structure. Moreover, chapter 2 also finds evidence that long-term oriented foreign institutional investors, who have a stronger incentive to be effective monitors of managerial tax-related activity, have a more pronounced effect on peer tax planning compared to foreign investors with short-term horizons. Overall, my analysis suggests that foreign institutions act as effective monitors of managerial tax-related activity.

Chapter 2 makes a substantial contribution to the literature on institutional ownership and tax planning. A number of studies (Chen, Chen, Cheng, and Shevlin 2010; Cheng, Huang, Li, and Stanfield 2012; Khurana and Moser 2012; Khan, Srinivasan, and Tan 2017; Chen, Huang, Li, and Shevlin 2018) focus on institutional ownership in U.S. companies and tax avoidance, with most papers finding positive correlations between the two. Chapter 2 differs from these studies by distinguishing between foreign and domestic institutions within a global setting. It proposes and finds evidence that foreign and domestic ownership exert different monitoring effects on firms, with foreign institutions pushing firms toward their country and industry peer's effective tax rate and domestic institutions towards less efficient tax avoidance. Further, consistent with Khurana and Moser (2012), but not with Chen et al. (2018), chapter 2 presents evidence that this monitoring effect is stronger for firms with more powerful CEOs.

Chapter 2 relates to the literature on the effect of foreign institutional ownership on corporate decision-making, for example with respect to financial reporting comparability (Fang, Maffett, and Zhang 2015), financial reporting quality and voluntary disclosure (Beuselinck, Blanco, and García Lara 2017; Tsang, Xie, and Xin 2019), cross-border mergers and acquisitions (Ferreira, Massa, and Matos 2010) and investments in tangible, intangible and human capital (Bena et al. 2017). It adds to this branch of literature by presenting evidence that foreign institutional investors lead to a more effective tax management in their portfolio firms.

Chapter 2 also contributes to the literature on peer effects on corporate outcomes. Prior studies show evidence of peer effects on corporate financial policy (Leary and Roberts 2014), takeover defences (Servaes and Tamayo 2014) and incentive compensation schemes provided to executives (Albuquerque 2009), while an emergent stream of literature investigates whether a firm's tax strategy relates to the tax position of its peers (Kubick, Lynch, Mayberry, and Omer 2015; Bird, Edwards, and Ruchti 2018; Armstrong, Glaeser, and Kepler 2019; Heitzman and Ogneva 2019). Chapter 2 contributes to this stream of research by presenting evidence that companies with higher foreign institutional ownership are more likely to mimic the tax position of their peers. Findings are consistent with this "tax squeezing effect" being more prevalent for larger and more profitable firms, thus supporting a political cost view of tax planning (Watts and Zimmerman 1978; Zimmerman 1983).

Findings from chapter 2 can be informative to regulators, legislators and other company stakeholders at both national and international level when designing and enforcing policies targeting at corporate tax avoidance. Unlike anecdotal evidence, the analysis in chapter 2 suggests that foreign institutions act as effective corporate monitors, as their presence is associated with an increase in tax planning in companies subject to high tax rates and a decrease in tax planning in companies engaging in a more aggressive tax avoidance. In addition, the findings that a firm's tax position generates externalities on other firms in the same industry/country can also be relevant for policymakers, for instance, when designing tax incentives for specific industries.

1.3 Passive investors and information asymmetries

In chapter 3, I examine the association between indexed institutional ownership and geographic segment disclosure using sample of more than 4,400 U.S. publicly listed companies between the years 1998 and 2016. The main source of inquiry of chapter 3 is whether investors with traditionally passive, index-tracking trading strategies are effective monitors of geographic information production in their investee firms.

ASC 280 (previously SFAS 131) provides the legal framework of geographic segment disclosure. Firms are required to present their operations disaggregated by one or more operating segments (such as industry, geographic area, legal entity or type of costumer) in accordance with their organizational architecture and to provide financial information for each "material" country in which they earn revenues and hold

assets. Operations for all "immaterial" countries can be aggregated at higher levels (regions, continents or in one "Total Foreign" residual entry).

Yet, the vague definition of materiality in ASC 280 allows corporate managers to have some discretion on the countries that are classified as "immaterial" and can, thereby, be aggregated and those that are in fact "material". In practice, a significant number of firms aggregate their financial information at higher levels in response to the preferences of corporate managers or better informed investors (Herrmann and Thomas 2000; Akamah, Hope, and Thomas 2017). In chapter 3, I conjecture that this discretion can also have potential implications for firm transparency, warranting an increased demand for monitoring managers' disclosure motives.

A number of studies support the view that indexed investors engage in effective monitoring over corporate management (Appel et al. 2016; Crane et al. 2016) and influence in particular transparency and information production in the forms of management forecasts, analysts following and liquidity (Boone and White 2015; Bird and Karolyi 2016; Schoenfeld 2017). In contrast with these studies, Schmidt and Fahlenbrach (2017) show that firms owned by indexed investors experience greater accumulation of roles, fewer independent director appointments and worse M&A transactions due to the high monitoring costs that such activities may entail.

Thus, the monitoring role of indexed investors could be more complex than originally thought. Differently from management earnings forecasts, indexed investors are likely to incur higher costs to monitor country-level information production in their numerous and diverse holdings. In such a setting, I posit that indexed investors can act as effective corporate monitors and strategically direct their monitoring effort towards those firms experiencing greater information asymmetries and governance problems.

I find that firms with larger indexed ownership are overall less transparent with respect to their geographic operations. Yet, this effect is less pronounced for firms that are exposed to greater information asymmetries and governance problems. Results in chapter 3 thus are consistent with a strategic allocation of resources from index investors with respect to their monitoring activities. I proxy for weaknesses in firms' governance structures using unreported tax haven operations, accumulation of roles and active ownership concentration (McCahery, Sautner, and Starks 2016; Akamah et al. 2017; Schmidt and Fahlenbrach 2017; Dyreng, Hoopes, Langetieg, and Wilde 2018).

Following Cremers and Pareek (2016), I find consistent results using two different samples of indexed ownership. The first sample relates to the equity holdings of 13F - indexed institutional investors as reported by the Factset LionShare database, while the second sample consists of firms held by S12 - indexed mutual funds as from the Thomson Reuters database.

To provide causal support to the analysis in chapter 3, I exploit two sources of exogenous variation to indexed ownership. First, I conduct a difference-in-differences (DID) analysis using a SEC's exemptive relief order that permits mutual funds to invest in iShares Exchange Traded Funds (ETFs) in excess of the maximum amount outlined in section 12(d) of the Investment Company Act of 1940 from May 2003 onwards. Second, I take advantage of the discontinuity surrounding Russell index inclusion to implement both instrumental variable (IV) and fuzzy regression discontinuity (RDD) analyses.

Overall, results reported in chapter 3 suggest that indexed investors are less likely to monitor country-by-country operation disclosure of every firm of their large and diversified portfolios. However, this class of shareholder acts as effective corporate monitors of country-level operation disclosure in firms that are in greater need of monitoring and informational transparency. Chapter 3 thus shows evidence of a more nuanced approach of indexed investors in their demand for increased informational transparency in their investee firms.

These findings can be relevant for policymakers and corporate stakeholders when designing policies aimed to provide greater transparency about firms' geographic operations. At international level, the comparability between the IFRS 8 and SFAS 131, resulting from an ongoing convergence project between IFRS and US GAAP, makes results informative also for those countries implementing IFRS principles. Unlike anecdotal evidence, chapter 3 shows that indexed investors act as effective corporate monitors, as their presence is associated with greater country-by-country operation disclosure in firms that are exposed to greater information asymmetries and governance problems.

1.4 Corporate tax avoidance and labour demand

In chapter 4, I examine the association between tax avoidance and firms' hiring policies using a sample of more than 3,000 U.S. publicly listed companies between

1992 and 2017. The main source of inquiry of chapter 4 is whether corporate tax avoidance, which encompasses statutory tax rates, incentives, complexities and enforcements of tax systems and firms' tax planning preferences, affects hiring decisions.

Labour is an important factor of production, which requires significant investments by firms. Yet, there is substantial variation in net hiring across U.S. companies. Part of this variation can be attributed to changes in firms' underlying economic fundamentals (such as sales growth, profitability, liquidity and financial constraints) and industry-level employment rates and is therefore expected. In chapter 4, I investigate whether abnormal variations in labour investments relative to such expected levels can be explained by firms' low cash effective tax rates (Low Cash ETR), my proxy for corporate tax avoidance.

From a theoretical standpoint, risks and uncertainties associated with tax avoidance can generate an important friction in firms' investment opportunities (or real options) that can make firms more cautious when investing. Firms avoiding taxes are exposed to potential reductions of cash flow and investor wealth if, following an investigation, tax authorities rule the firm's tax strategy abusive. For example, tax authorities can enforce penalties, additional payments of taxes and interests and firms may also experience reputational loss due to increased public scrutiny (sometimes referred to as "tax shaming").

A number of studies in the real option literature provide evidence that firms withhold investments in presence of uncertainty ("wait and see" strategy (Bloom, Bond, and Van Reenen 2007)) and Dixit (1997) shows that a similar pattern also applies to labour investments. Investments in human capital matter for firms' retaining policies because adjustment costs of labour are arguably high. For example firms incur the costs of searching, selecting, hiring, training and possibly firing (Bentolila and Bertola 1990; Dixit 1997) and these costs increase with higher job-specific skills (Ghaly, Anh Dang, and Stathopoulos 2017).

All the arguments above suggest that firms are likely to respond to increased uncertainty and risks from tax avoidance by withholding their investments and more specifically their labour demand. Therefore, in chapter 4, I test whether firms with low cash effective tax rates (Low Cash ETR) undertake sub-optimal labor investments with respect to the level expected based on the firms' economic fundamentals and industry

medians.

Following Pinnuck and Lillis (2007) and Jung, Lee, and Weber (2014), I compute an inverse measure of labour efficiency as the absolute value of the difference between a firm's net hiring and its expected level. The expected labour investment is based on a model of firms' change in hiring policies as a function of sales growth, profitability, liquidity and leverage developed by Pinnuck and Lillis (2007). This variable, therefore, captures changes in firms' hiring policies that cannot be explained by the firms' underlying economic fundamentals. In supplemental analysis, I replace the expected level of hiring with the industry-median net hiring and average net hiring in the previous three years. These variables therefore capture deviations of firms' changes in hiring policies from industry and prior years' human capital investments.

I find a positive and significant association between Low Cash ETR in the current year and firms' abnormal net hiring in the following year. However, after breaking down the sample into firms with net hiring above (over- investment) and below (under-investment) the level justified by their underlying economic fundamentals, I find that the effect of tax avoidance on labour is asymmetric: it is statistically insignificant for firms over-investing in labour whereas it is positive and significant for firms under-investing in human capital. Overall, this result suggests that firms with Low Cash ETR increase sub-optimal hiring policies, by choosing a level of net hiring that is below the one expected based firms' fundamentals and industry medians.

To provide a causal support to my findings, chapter 4 takes advantage of Ireland's statutory corporate tax cut occurred in December 1997 in a difference-in-differences (DID) design. For this test, the treatment group consists of U.S. multinationals with operations in Ireland before and during the phased reduction of the statutory tax rate that began in December 1997, whereas the control group includes U.S. multinationals with foreign operations in countries other than Ireland. Firms in the control group represent the best match to firms in the treatment group based on several lagged covariates and industry fixed effects. Overall, results from this test are consistent with the main findings of chapter 4 in that, following the reduction in Ireland's statutory corporate tax rate, firms with Irish operations withhold their investments in human capital compared to firms without Irish operations.

Next, I examine whether firms exposed to greater tax risks and uncertainties are associated with abnormal net hiring. The rationale of this test lays in the precautionary

motives that can lead firms to choose a level of net hiring below the expected level (Bloom, Bond, and Van Reenen 2007). I first examine a sub-sample of firms with high tax risk (proxied by a five-year volatility of Cash ETR above the sample median) and find that the effect on abnormal net hiring is stronger for this group of firms. Second, I use firms' uncertain tax benefit reserve (proxied by UTB above the sample median) to investigate whether firms with higher tax uncertainty undertake abnormal labour investments. Consistent with my predictions, chapter 4 shows that firms with high tax uncertainty choose a level of net hiring that deviates from the expected level based on firms' fundamentals.

Chapter 4 relates and contributes to several strands of the literature. The first focuses on tax risk and uncertainty. Empirical evidence suggests that tax risks can impact firms' overall risk (Hanlon and Slemrod 2009; Kim, Li, and Zhang 2011; Guenther, Matsunaga, and Williams 2017) and that firms take action to reduce tax risks (Dyreng, Hoopes, and Wilde 2016). Tax avoidance can also generate tax uncertainty (Guenther, Wilson, and Wu 2018) and firms are found to increase their cash balances as a way of hedging themselves from future tax payments (Hanlon, Maydew, and Saavedra 2017). Chapter 4 contributes to this literature by presenting evidence that tax risks and uncertainties can affect firms' resource allocation by leading firms to make sub- optimal hiring decisions.

The second strand of the literature focuses on the effect of uncertainty on real options. Prior studies suggest that in the presence of uncertainty firms are less likely to undertake costly investments or disinvestments (i.e. inaction) (Dixit and Pindyck 1995; Bloom et al. 2007; Trigeorgis and Reuer 2017) and that uncertainty affects labor policies by leading firms to minimize costly adjustments due to hiring and firing (i.e. retention policies) (Oi 1962; Bentolila and Bertola 1990; Dixit 1997; Banker, Byzalov, and Chen 2013; Ghaly et al. 2017). Chapter 4 adds to this strand of research by studying tax avoidance as a source of uncertainty and by providing evidence that tax avoidance affects firms' labor policies leading to sub-optimal hiring policies relative to the expected level based on firms' fundamentals and industry medians.

The third strand of literature focuses on the consequences of tax avoidance for corporate stakeholders. Overall, evidence from this area of research are consistent with the view of tax avoidance affecting different capital providers asymmetrically, with equity holders sharing the benefits of greater tax savings (Desai and Dharmapala 2009;

Wilson 2009; Goh, Lee, Lim, and Shevlin 2016; Rego, Williams, and Wilson 2017) whereas debt holders being exposed to the risks, but not sharing the benefits, of firms' more aggressive tax strategies (Shevlin, Urcan, and Vasvari 2013; Hasan, Hoi, Wu, and Zhang 2014). Chapter 4 extends this literature by focusing on an important class of corporate stakeholders - firms' workers and employees - and by presenting evidence that tax avoidance, involving the risks of future additional tax payments, penalties and reputational loss, leads firms to make sub-optimal labour investment decisions.

Findings in chapter 4 can also have important policy implications. First, they provide evidence that, at least for a sub-set of firms with opportunities to avoid taxes, tax avoidance leads firms to make sub-optimal hiring decisions relative to the hiring level justified by firms' underlying economic fundamentals and industry medians. Second, by showing that fiscal stimuli to labour may be less effective in presence of tax risks and uncertainty, results in chapter 4 can be informative to legislators and to labour unions when contracting stricter employment protection mechanisms and wage increases.

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Chapter 2

Foreign institutional ownership and corporate tax planning

2.1 Introduction and motivation

In chapter 2, I examine the effects that financial globalization has on tax planning. The sample encompasses over 26,000 publicly listed companies from 48 countries over the period 2000-2016. The main source of inquiry of this chapter is whether equity investments by foreign institutions impact the invested firms' tax planning.

The concept of what tax planning is has evolved over time. Many studies specifically equate tax planning with tax avoidance (e.g. Desai and Dharmapala (2006), Graham, Hanlon, Shevlin, and Shroff (2014) and Khan, Srinivasan, and Tan (2017)), that is, the reduction of explicit corporate taxes (Hanlon and Heitzman 2010). Because corporate taxes represent a cost to shareholders, reducing this cost leads to higher after-tax earnings and, presumably, to higher shareholder returns.[2] If institutions are profit maximizers, then, under this view, all institutions, foreign or domestic, favour a corporate tax plan of higher tax avoidance.

However, theoretical and empirical studies suggest that tax planning is more nuanced in that tax avoidance entails the risks of companies incurring payments of additional taxes, penalties, and interest if tax authorities later challenge the adopted tax strategy (Hanlon and Heitzman 2010; Blouin 2014), greater agency costs (Slemrod 2004; Desai, Dyck, and Zingales 2007), reputation loss (Graham et al. 2014), undesirable deviations from social norms (Boone, Khurana, and Raman 2013; Hasan, Hoi, Wu, and Zhang 2017), and enhanced political costs (Jensen and Meckling 1978; Watts and Zimmerman 1978). Under this view, institutions may favour a more balanced tax planning approach, trading off the costs and benefits that firms incur from a uni-directional tax avoidance strategy.

[2] The OECD estimates the loss of corporate tax revenues attributable to tax evasion and tax avoidance in the range of $100bn and $240bn per year.

One implication of this trade-off between costs and benefits is that firms may look to their industry peers for tax planning strategies. Armstrong, Gleaser, and Kepler (2019) present evidence that firms react to deviations between their tax rates and industry competitors by moving their tax rates towards industry peers. Using survey data, Graham, Hanlon, and Shevlin (2011) document companies benchmarking their tax positions against those of other companies operating in the same industry and that these comparisons extend across different jurisdictions. Similarly, interviews with tax executives led by Radcliffe, Spence, Stein, and Wilkinson (2018) confirm that firms focus their tax positions towards "industry norms". For example, a tax executive stated: "Relative to other companies [in our industry] our effective tax rate is 16% and most other companies are between 16 and 20. That's kind of the norm in Canada, based on the incentives that are there. So, you know, our tax rate isn't 2%. It's always been between 15 and 20." (p.52).

Armstrong et al. (2019) attribute some of these tax decisions to economic factors, but they also state that a firm's new tax strategy relates strongly to managements' concerns about being perceived as being overly aggressive in their tax planning, i.e., engaging in too much tax avoidance. In a similar vein, Graham et al. (2014) find that the majority of surveyed tax executives at publicly-traded firms would forego a tax reducing strategy if the tax strategy lacks an economic purpose, hurts the company's reputation, increases the risk of the strategy being challenged by the IRS, increases the possibility of generating negative media attention, or leads to a possible accounting restatement. Such decisions though can also entail significant reputational costs as recent evidence shows that CEOs of companies that pay substantially higher taxes compared to their peers, i.e. not engaging in tax avoidance, are more likely to experience a forced turnover (Chyz and Gaertner 2018).

In this chapter, I posit that the presence of foreign institutional investors plays a disciplinary role by leading corporate managers to engage in a level of tax planning that is consistent with the average tax position of the company's country and industry peers, as this level is more likely to meet their expectations on the cost-benefit trade-off of corporate tax policies[3]. I further predict that larger firms and more profitable firms are

[3] For instance, in March 2015 the Local Authority Pension Fund Forum (LAPFF) requested every FTSE 100 company, through written letters, to submit information about their tax affairs. Similarly, Sasja Beslik, head of sustainable finance at Nordea Asset Management, on aggressive tax structures in their portfolio states that: "Nordea's letter asks the companies to lay out their tax risks and disclose whether

more sensitive to deviations from their country/industry norms due to political costs associated with being perceived as overly aggressive (Watts and Zimmerman 1978; Zimmerman 1983). Foreign institutions are able to engage in a more independent and objective monitoring over corporate tax management due to their weaker ties with local businesses and with management (Gillan and Starks 2000; Ferreira and Matos 2008). In contrast, domestic institutional investors may have incentives to monitor less as their businesses are more likely to be intertwined with local business actors – such as companies, governmental authorities and communities. Further, domestic financial institutions often manage or provide trading platforms for domestic companies' pension funds, thus compromising their potential oversight roles (Giannetti and Laeven 2009).

The disciplining effect of foreign institutions on firm practices is shown in a number of recent empirical studies. These practices include corporate governance mechanisms (Aggarwal, Erel, Ferreira, and Matos 2011), financial reporting comparability and quality (Fang, Maffett, and Zhang 2015; Beuselinck, Blanco, and García Lara 2017), voluntary disclosure (Tsang, Xie, and Xin 2019), cross-border mergers and acquisitions (Ferreira, Massa and Matos 2010), innovation and long-term investments (Bena, Ferreira, Matos, and Pires 2017), and hedge fund activism outcomes (Becht, Franks, Grant, and Wagner 2017).

A counter view is that all institutional investors promote myopic investments in their portfolio firms to boost short-term investment returns (The New York Times 2000; Financial Times 2010). Under this view, foreign institutions prefer their invested firms to engage in tax avoidance to increase their short-term income and stock returns. Although prior papers do not separate institutional ownership into foreign and domestic pieces, several studies support the view that institutions favour a unilateral policy of tax avoidance. For example, Chen, Chen, Cheng, and Shevlin (2010) provide evidence that family firms with long-term institutional investors are more tax aggressive relative to family firms without institutional investors. Cheng, Huang, Li, and Stanfield (2012) find that tax avoidance increases after the intervention of activist

these have been discussed at board meetings. If they don't comply […] Nordea will rally other investors and propose shareholder resolutions" (Financial Times 2016).

hedge funds relative to the pre-intervention period, and Khan et al. (2017) show that quasi-indexer ownership is associated with more tax avoidance.[4]

I conduct the empirical analysis using a large sample of publicly listed companies from 48 countries over the period 2000-2016. Consistent with Armstrong, Blouin, Jagolinzer, and Larcker (2015), I compute a relative measure of tax planning as the difference between a company's effective tax rate (ETR) and the average ETR of its industry and country peers (we refer to this variable as ETR Diff). I then define the peer tax planning using an indicator if a firm/year observation is in the third quintile of the ETR Diff distribution (i.e. the closest to zero). I use a similar procedure to calculate the minimum difference between tax paid and the average tax paid by peer firms. I find that higher foreign ownership in the current year increases the likelihood of peer tax planning in the following year. I find the opposite association for domestic ownership.

I also present evidence that higher foreign institutional ownership in the current year is associated with less aggressive tax positions (low or high tax avoidance relative to peer levels) in the next year. That is, I find a negative association between this year's foreign institutional ownership and a firm being in the first quintile of ETR Diff (extreme tax avoiders) next year as well as a negative relation between this year's foreign institutional ownership and a firm being in the fifth quintile of ETR Diff (extreme payers) the next year. Thus, my findings support a symmetrical interpretation of peer planning for tax purposes.

Despite using a lag/lead model, the endogeneity of foreign institutional ownership makes it difficult to establish causal relations. Foreign investors may choose to invest in companies planning to reduce their tax rates, or there may be missing factors associated with both foreign institutional ownership and the firm's tax rate. To address both the omitted correlated variables concern and reverse causality, I use two methods to isolate a plausible exogenous change in foreign institutional ownership.

First, I exploit a regulatory change in Norway's insurance and pension fund industry occurred in January 2008, which eliminated a 35% restriction of equity investments for insurance and pension funds' investment portfolios, using a difference-in-differences

[4] Chen, Huang, Li, and Shevlin (2018) find evidence consistent with Khan et al. (2017), but they attribute their results to quasi-indexers focusing on improving a firm's overall performance as measured by ROA and not by tax avoidance per se.

analysis. As I show, this change led to large increases in foreign equity investments by Norway's insurance and pension funds (treatment group) from 2008 onwards but not the percentage of foreign stocks held by Norwegian institutional investors other than pensions and insurances (control group). It is worth noting that Norway's Government Pension Fund Global (GPFG) is the largest sovereign wealth fund in the world (The Economist 2011; Forbes 2019) having more than $1 trillion of assets under management (AUM), with about $625 billion equity holdings in almost nine thousand companies in seventy-seven countries (CNBC 2017).

Second, I instrument (IV) foreign institutional ownership using the addition (and deletion) of companies to the MSCI ACWI (Aggarwal et al. 2011, Bena et al. 2017). Given that companies cannot directly control their addition (or deletion) to the index (which is based on their market capitalization relatively to other firms), and that international investors use the index to benchmark their portfolios, MSCI ACWI membership can be considered a valid instrument for foreign institutional ownership. My two-stage results are consistent with the ones I find using a difference-in-differences methodology (DID).

I acknowledge that my identification methods come with caveats. Although widely applied in previous literature, the use of MSCI ACWI membership as an instrument for foreign institutional ownership is arguably biased towards smaller firms, which are more likely to be added or deleted from the index. However, its use renders my results comparable to that of other studies focusing on the impact of foreign investors on corporate decision-making within a global setting. My difference-in-differences (DID) analysis mitigates these concerns, but in this case it could be argued that my setting becomes narrowed down to investment activity originating from one country. However, given the importance of Norwegian institutional investors for equity investments at a global level, I am confident about the generalizability and relevance of my findings. Overall, I believe that my identification strategy constitutes a well-balanced approach at isolating plausible exogenous changes in foreign institutional ownership.

Having demonstrated the association between foreign investors and tax planning, I propose a political cost explanation consistent with Watts and Zimmerman (1978) and with Zimmerman (1983). Both papers suggest that large and profitable firms are less likely to be extreme tax avoiders due to political costs associated with being perceived

as outliers by the government or their customers. These costs include being fined, being government targets, or having customers shun the products of firms deemed to be overly aggressive in their tax planning. Consistent with this premise, recent evidence by Chen, Powers and Stomberg (2019) shows that the negative tone of media coverage on tax issues increases with larger and more visible firms. I conduct several tests within chapter 2 and find evidence consistent with a political cost theory of tax planning.

Finally, I examine if the monitoring activities of foreign institutions are substitutes or complements of the firms' other governance structures. I find the effect of foreign institutions on tax planning to be stronger for companies with powerful CEOs and with lower incentive-based executive compensation. These findings are consistent with foreign institutions acting as monitors within the firm's corporate governance structure. Moreover, I also provide evidence that long-term oriented foreign institutional investors, who have a stronger incentive to be effective monitors of managerial tax-related activity, have a more pronounced effect on peer tax planning compared to foreign investors with short-term horizons. Overall, my analyses in chapter 2 suggest that foreign institutions act as effective monitors of managerial tax-related activity.

Chapter 2 contributes to several strands of literature. It adds to the literature on institutional ownership and tax planning. A number of studies (Chen et al. 2010; Cheng et al. 2012; Khurana and Moser 2012; Khan et al. 2017; Chen, Huang, Li, and Shevlin 2018) focus on institutional ownership in US companies and tax avoidance, with most papers finding positive correlations between the two. Chapter 2 differs from these studies by differentiating between foreign and domestic institutions within a global setting. I propose and find evidence that foreign and domestic ownership exert different monitoring effects on firms, with foreign institutions pushing firms toward their country and industry peer's effective tax rate and domestic institutions towards less efficient tax avoidance. Further, consistent with Khurana and Moser (2012), but not with Chen et al. (2018), I present evidence that this monitoring effect is stronger for firms with more powerful CEOs.

Chapter 2 relates to the literature on the effect of foreign institutional ownership on corporate decision-making, for example with respect to financial reporting comparability (Fang et al. 2015), financial reporting quality and voluntary disclosure (Beuselinck et al. 2017; Tsang et al. 2019), cross-border mergers and acquisitions

(Ferreira, Massa, and Matos 2010) and investments in tangible, intangible and human capital (Bena et al. 2017). It adds to this branch of literature by presenting evidence that foreign institutional investors lead to a more effective tax management in their portfolio firms.

Chapter 2 also contributes to the literature on peer effects on corporate outcomes. Prior studies show evidence of peer effects on corporate financial policy (Leary and Roberts 2014), takeover defenses (Servaes and Tamayo 2014) and incentive compensation schemes provided to executives (Albuquerque 2009), while an emergent stream of literature investigates whether a firm's tax strategy relates to the tax position of its peers (Kubick, Lynch, Mayberry, and Omer 2015; Bird, Edwards, and Ruchti 2018; Armstrong et al. 2019; Heitzman and Ogneva 2019). Chapter 2 contributes to this stream of research by presenting evidence that companies with higher foreign institutional ownership are more likely to mimic the tax position of their peers. Findings in chapter 2 are consistent with this tax squeezing effect being more prevalent for larger and more profitable firms, thus supporting a political cost view of tax planning (Watts and Zimmerman 1978; Zimmerman 1983).

Finally, chapter 2 uses a similar setting as Hasan, Kim, Teng, and Wu (2016) although the two studies ask very different research questions. Hasan et al. (2016) examine whether the social norms of institutions' home countries translate into invested companies changing their taste for tax avoidance. In chapter 2, I examine whether foreign institutional investments result in firms moving towards their country and industry peer tax rates. Hasan et al. (2016) find evidence in support of their hypothesis. However, their research questions as well as their sample period and the data needed to calculate their measure of tax avoidance produce a much smaller and different sample than mine, making comparisons between their study and mine difficult to do.

Findings in chapter 2 can be informative to regulators, legislators and other company stakeholders at both national and international level when designing and enforcing policies targeting at corporate tax avoidance. Unlike conventional wisdom, my analysis suggests that foreign institutions act as effective corporate monitors, as their presence is associated with an increase in tax planning in companies subject to high tax rates and a decrease in tax planning in companies engaging in a more aggressive tax avoidance. In addition, my findings that a firm's tax position generates

externalities on other firms in the same industry/country can also be relevant for policymakers, for instance, when designing tax incentives for specific industries. The remainder of chapter 2 is organized as follows. Section 2.2 provides some background information and reviews prior literature. Section 2.3 provides details on the data and research design while section 2.4 discusses my findings. Section 2.5 concludes.

2.2 Review of relevant literature

Chapter 2 relates to and builds on several literature streams. Hanlon and Heitzman (2010) describe tax avoidance as a continuum of activities and strategies that can be ordered progressively in terms of their tax aggressiveness, with tax-exempt municipal bonds and tax shelters being at the bottom and top ends of the continuum, respectively. However, as Blouin (2014) asserts, aggressive tax avoidance can be defined only in relation to the risk profile of a company's tax planning activity/strategy. That is, while some activities/strategies provide certain tax savings, others involve the risk of being red-flagged by the competent authorities in case of future tax audits. The risk of regulatory scrutiny can deter companies from engaging in aggressive tax avoidance as potential additional taxes, interests and penalties imposed by the authorities may substantially impact cash flow and shareholders' value.

In a similar vein, Jensen and Meckling (1978) and Watts and Zimmerman (1978) note that the political sector has the power to affect wealth transfers between various groups, with corporations being "especially vulnerable" to these wealth redistributions (Watts and Zimmerman 1978, p. 115). These redistributions can come in the form of increased corporate taxes or with new regulations. Several recent high profile cases illustrate how government entities punish firms perceived as being too tax aggressive – even though their tax policies are not illegal. In 2016, Alphabet reached a settlement with the British tax authorities to pay additional taxes of £130 million on revenues earned between 2005 and 2014 and in the same year, the European Commission demanded additional taxes from Apple of €13 billion for its aggressive tax planning (Financial Times 2016). Both companies used a tax strategy called the double Irish and Dutch sandwich to reduce their tax bills by moving profits through the Netherlands and Ireland (Financial Times 2016).

Retributions can come also from the private sector. For example, customers can react negatively to the revelation of a corporation's tax avoidance by boycotting its

goods or avoiding its services. Starbuck's share of coffee sales in Britain fell dramatically in the year following Reuter's exposé of Starbuck's tax aggression – even after the firm pledged £20 million in voluntary tax payments to the U.K. (The Guardian 2013).

Both public and private sector reactions are consonant with a political cost theory of tax planning (Watts and Zimmerman 1978, Zimmerman 1983). Under this theory, larger and more profitable firms are scrutinized more closely. Therefore, as compared to smaller and less profitable firms, they will set their tax avoidance policies in a way as to not deviate too much from their peer groups. In the setting of chapter 2, peer firms are in the same industry and country as the affected firm.

A number of studies document peer effects in corporate policies such as financing decisions (Leary and Roberts 2014), takeover defences (Servaes and Tamayo 2014) and executive compensation schemes (Albuquerque 2009). A recent stream of literature explores the extent of peer effects in corporate tax avoidance. Several mechanisms are proposed to explain these effects. Firm can learn from each other through network ties and board connections, thus adopting similar levels of tax positions (Brown 2011; Brown and Drake 2014). Firm can mimic tax positions of peers they consider to be better informed about available tax avoidance opportunities (Kubick et al. 2015). Collective rational herding behaviour can also generate peer tax avoidance. That is, firms with similar objective functions may find themselves adopting similar tax positions (Armstrong et al. 2019; Heitzman and Ogneva 2019). Chapter 2 adds to this literature by proposing a political cost rationale for large, profitable firms using an international sample.

A different stream of accounting literature investigates tax avoidance from an agency theory perspective (Slemrod 2004; Chen and Chu 2005; Crocker and Slemrod 2005). Under this view, the separation between ownership and control plays a central role in determining the level of tax avoidance due to conflicts between those receiving the tax benefits and those bearing the risks of tax avoidance. Part of this literature focuses on different types of ownership structures, with "inside" ownership referring to equity held by members of a founding family (Chen et al. 2010) or corporate managers (McGuire, Wang, and Wilson 2014), and "outside" ownership being equity held by private equity firms (Badertscher, Katz, and Rego 2013), hedge funds (Cheng et al. 2012), or indexer mutual funds (Khan et al. 2017; Chen et al. 2018). In chapter 2,

I extend this literature by examining if "outside" investors located in different countries to the one in which the firm is listed (i.e. foreign institutional investors) influence corporate tax policies.

A few studies provide evidence that foreign institutional investors contribute to important changes in corporate policies of their equity holdings. For instance, foreign institutions are associated with better corporate governance practices (Aggarwal et al. 2011; Ferreira and Matos 2008), financial reporting comparability (Fang et al. 2015) and financial reporting quality (Beuselinck et al. 2017). Moreover, evidence suggests that companies held by foreign institutional investors are more likely to be innovative and to engage in long-term investments in tangible, intangible and human capital (Bena et al. 2017). Foreign institutional ownership has also been found to play a key role in cross-border mergers and acquisitions (Ferreira et al. 2010).

However, the question of whether foreign institutional ownership influences peer effects in corporate tax policies is still an issue relatively unexplored. The Financial Times (2016) provides some examples of foreign institutional investors expressing publicly their dissent about invested firms' aggressive tax planning. These examples include Nordea Asset Management, a Nordic fund house, writing negatively about tax avoidance to Alphabet, Apple, and Starbucks, as well as several UK asset management and pension funds writing in the same vein to Alphabet. That these firms are among the largest and most profitable firms in the world is consistent with Watts and Zimmerman's (1978) contention that political costs are greater for firms with higher reported profits and firm size. In chapter 2, I address these issues using a large sample of international firms.

2.3 Data and research design

2.3.1 Data sources

I build my sample using two main sources. International accounting data come from Worldscope and institutional ownership data come from Factset LionShares (see Ferreira and Matos 2008). I require countries/industry pairs (defined using the Fama and French (1997) 48 industry classification) to have at least fifty observations. Moreover, my sample excludes utilities (SIC codes 4900-4999) and companies operating in the financial sector (SIC codes 6000-6999) as these industries are subject

to different regulations (Hope, Ma, and Thomas 2013; Bena et al. 2017). Similarly, I remove firm-year observations that do not have pre-tax income or income tax data, or with missing data across my explanatory and control variables. Following previous studies, I restrict corporate effective tax rates (ETRs) between zero and one and winsorize all other continuous variables at the 1st and 99th percentiles (Dyreng, Hanlon, and Maydew 2010). After employing my screens, I retain data on 48 countries at a yearly frequency over the period 2000-2016. The final sample has 26,082 unique firms with 163,003 firm-year observations.

2.3.2 Empirical Model

To test the effect of foreign institutional ownership on corporate tax planning, I estimate the following Equation [1]:

$$\text{Peer Tax Diff}_{it} = \alpha_0 + \alpha_1 \text{Foreign IO}_{it-1} + \alpha_2 \text{Domestic IO}_{it-1} + \alpha_3 \text{Firm size}_{it-1} + \alpha_4 \text{Pretax income}_{it-1} + \Sigma\alpha_i X_{it-1} + \alpha_j \text{Year FE} + \varepsilon, \quad [1]$$

where Peer Tax Diff_{it} is either Peer ETR Diff_{it} or Peer Cash ETR Diff_{it}, (defined below), Foreign IO_{it-1} and Domestic IO_{it-1} represent percentages of firm i's stocks held in year t-1 by foreign and domestic institutions respectively, Firm size_{it-1} is the natural logarithm of market value and Pretax income_{it-1} is pretax income scaled by total assets. X_{it-1} includes control variables explaining variations in corporate tax planning and potentially correlated (but not highly correlated) with foreign institutional holdings. I also include Year FE, a yearly fixed effect. By construction, my model takes into account country and industry fixed effects.

2.3.3 Tax planning variables

In this chapter, I use two corporate tax-planning variables. I construct the first variable, ETR Diff, based on the difference between a company's ETR (defined as total income tax expense divided by pre-tax income) and the average ETR of its country and industry (using Fama-French 48 industry classifications) peers. ETR Diff captures country- and industry-adjusted differences in tax rates across firms, regardless of their temporary (i.e. deferred taxes) or permanent nature. A negative ETR Diff

means the company has a lower ETR vis-à-vis its peer group (tax avoidance) and a positive ETR Diff indicates the opposite (non-tax avoidance). As a robustness test, I later use an alternative peer definition based, as in Armstrong et al. (2015) and Balakrishnan, Blouin, and Guay (2019), on size and industry.

I rank ETR Diff from low to high and divide them into quintiles. Panel A of Table 2.1 presents the quintile distribution of ETR Diff. Peer ETR Diff is an indicator if the company's ETR Diff lies in the third quintile, as this represents the group of companies with the smallest ETR Diff in absolute terms, and zero otherwise. The mean (median) Peer ETR Diff is -0.01 (-0.01), indicating that firms in this quintile have deviations from their country/industry peers very close to zero. In a similar vein, I designate firms in the first quintile as over-investors in tax avoidance (Low ETR Diff) and firms in the fifth quintile as under-investors in tax avoidance (High ETR Diff). The mean (median) values for these firms are -0.24 (-0.23) for tax avoiders (Low ETR Diff) and 0.29 (0.20) for the non-avoiders (High ETR Diff).

My second tax planning measure is Peer Cash ETR Diff. Similar to the Peer ETR Diff, I compute this variable as an indicator if the difference between a firm's Cash ETR (defined as tax paid divided by pre-tax income) and the average Cash ETR of its country and industry peers lies in the third quintile of the Cash ETR Diff distribution. Unlike ETR, Cash ETR is, by construction, affected by strategies aimed to defer corporate taxes to the following periods, as well as, by tax payments on corporate incomes generated in the previous periods. As a result, Peer Cash ETR Diff captures country-industry similarities in the rate of taxes paid by companies at the end of the current period. I further designate firms in the first quintile of Cash ETR Diff as over-investors in tax avoidance (Low Cash ETR Diff) and firms in the fifth quintile of Cash ETR Diff as under-investors in tax avoidance (High Cash ETR Diff). As Table 2.1, Panel A shows, the mean (median) Peer Cash ETR Diff is -0.05 (-0.05). Further, the means and medians of the Cash ETR Diff quintiles are similar to those reported using the earnings measure of ETR (ETR Diff).

The use of firms' effective tax rates (ETRs) has several advantages. First, ETR and Cash ETR are easy to compute and interpret. They capture the total and cash rate of tax per dollar of corporate income and represent inverse measures of corporate tax avoidance. Second, they are directly observable by corporate boards, managers, shareholders and other stakeholders (Armstrong, Blouin, and Larcker 2012; Graham

et al. 2014). Third, they can be compared within industries and across companies and tax jurisdictions, thereby, making possible an analysis of peer effects. On this line, Graham et al. (2011) document that companies tend to benchmark their ETRs against the ETRs of their industry peers, and that such comparisons often extend across different jurisdictions.

One limitation of using ETRs is that they capture only non-conforming, and not conforming, tax avoidance. That is, while a low ETR represents the reduction of a company's tax liability, for instance, due to tax shelters (non-conforming tax avoidance), ETR does not capture companies that avoid taxes by reporting an accounting expense to benefit from its deduction from the taxable income (conforming tax avoidance).[5] See Blouin (2014) for further discussions about advantages and limitations of using ETRs as measures of corporate tax avoidance.

Table 2.1, Panel B presents cross-country statistics on ETR (Cash ETR) and ETR Diff (Cash ETR Diff). The average ETR (Cash ETR) for all countries is 0.23 (0.23) (i.e. 23%), with ranges from 0.37 (0.35) for Japan to 0.09 (0.06) for Bermuda (a renowned tax haven). The average ETR Diff (Cash ETR Diff), by construction, is 0.00 (0.00), with ranges from -0.13 (-0.15) for Bermuda to 0.09 (0.11) in Italy. Most firms have ranges within 0.02 of the mean country/industry ETR. Panel C shows cross-industry statistics. The ETR (Cash ETR) varies from 0.11 (0.13) for Precious Metals to 0.31 (0.33) for Tobacco Products. ETR Diff (Cash ETR Diff) ranges from -0.02 (-0.02) for Recreation to 0.08 (0.09) for Tobacco Products. Thus, I observe variations in tax rates among countries and industries and deviations from tax rates within my sample.

2.3.4 Institutional ownership variables

I collect international institutional ownership data for the years 2000-2016 from Factset LionShares database (Ferreira and Matos 2008). Factset LionShares typically includes stock holdings of professional fund managers, such as investment banks, insurance companies, mutual funds, pension funds and hedge funds, as reported by the mandatory N-30D and 13F filings with the Security Exchange Commission (SEC)

[5] For example, companies can take advantage of the deductibility of interests on debts to lower their tax base (Hanlon and Heitzman 2010).

for U.S. institutions and by local sources, such as national stock exchanges and statistic bodies, for institutions domiciled in other countries. Ferreira and Matos (2008) provide more details on the data coverage of Factset LionShares database.

My total institutional ownership (IO) variable is, for each firm, the sum of the holdings of all institutions divided by the firm's market capitalization at the end of the year.[6] I then identify the geographical origin of firms and institutional investors at country-level and classify foreign institutions as those investors domiciled in a different country from the one in which the investee firm is listed. In contrast, I classify domestic institutions as those investors domiciled in the same country in which the investee firm is listed. My foreign institutional ownership (Foreign IO) variable is, for each firm, the sum of the holdings of all foreign institutions divided by the firm's market capitalization at the end of the year. Similarly, domestic institutional ownership (Domestic IO) is the sum of the holdings of all domestic institutions divided by the firm's market capitalization at the end of the year. I lag institutional ownership by one year to provide greater support to my analysis and to mitigate simultaneous causality concerns.

Descriptive statistics in Panel B of Table 2.1 show that foreign institutional ownership accounts for 5% of firms' market capitalization on average in my sample. Ireland has the largest average foreign institutional ownership (25%), followed by the Netherlands (21%) and Luxembourg (17%). Domestic institutional ownership, on average, is equal to 19% of firms' market capitalization in my sample. Firms listed in the United States have the largest domestic institutional ownership level (48%), followed by those listed in Poland (19%) and in the United Kingdom (18%). Across industries (Panel C), firms operating in the Precious Metals (12%) and Tobacco Products (11%) sectors receive the largest share of capital from foreign institutions. By contrast, domestic institutional ownership is largest in the industries of Defense (44%), Aircrafts (32%) and Measuring & Control Equipment (32%).

[6] This includes ordinary share, preferred shares, American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs) and dual listing stocks when calculating institutional ownership.

2.3.5 Political cost proxy variables

Jensen and Meckling (1978) claim that large firms are subjected to greater government scrutiny and wealth transfers than smaller firms. Watts and Zimmerman (1978) refer to this phenomenon as a firm's political costs. Watts and Zimmerman (1978) propose that to limit these government intrusions, individual firms employ a number of "devices" including the choice of accounting procedures to minimize reported earnings. Consistent with a large firm political cost hypothesis, Watts and Zimmerman (1978) present a review of numerous studies showing that larger firms are more likely to choose income reducing accounting procedures than smaller firms. Watts and Zimmerman (1978) also assert that this unwanted scrutiny and wealth transfers are more likely for "high" profit firms, as these firms tend to warrant more public attention (p. 115).

Using effective tax rates as his measure of corporate taxes, Zimmerman (1983) asserts and shows that within industries, the largest U.S. exchange-listed firms within the manufacturing and the oil and gas sectors have the highest worldwide tax rates. He classifies corporate taxes as "one component of political costs" (p. 119) and asserts that these higher tax rates are indicative of large firm's political costs. As further evidence that large firms bear political costs, Zimmerman (1983) shows that these higher effective tax rates became effective only after the U.S. 1969 Tax Reform Act and after the OPEC countries raised their tax rates on U.S. oil producers.

I include Firm size and Pretax income as political cost proxy variables, where Firm size is the natural log of the firm's market value or alternatively of the firm's net sales (Watts and Zimmerman 1978), and Pretax income is pretax income divided by total assets (Watts and Zimmerman 1978). I predict a positive association between Peer Tax Diff and each political cost proxy variable.

2.3.6 Control variables

I include several control variables that prior studies show affect corporate tax policies and/or foreign institutional ownership. See the Appendix for all variable definitions. First, I control for domestic institutional ownership (Domestic IO) and shares owned by corporate insiders (Closely-held-shares). Chen et al. (2010), Desai and Dharmapala (2006) and McGuire, Omer, and Wilde (2014) provide evidence that

domestic institutions and insiders have different incentives and abilities to influence corporate tax policies compared to foreign institutional investors. In addition, prior studies suggest that large stock ownership by domestic institutions and corporate insiders deter investments by foreign institutions (Leuz, Lins, and Warnock 2008; Aggarwal et al. 2011; Ferreira and Matos 2008).

The second set of control variables helps separate the effect of foreign institutional ownership on tax rates from other firm-specific characteristics. Leverage (Leverage) takes into account reductions of firms' tax bases due to deductions of interest expenses (Frank, Lynch, and Rego 2009). Market-to-book value (Market-to-book) and foreign sales (Foreign sales) control for greater tax avoidance opportunities available to firms with growth potentials and international operations (Manzon and Plesko 2002; Hope et al. 2013; Kubick et al. 2015). Controlling for these factors is also important because institutional investors take into consideration firms' leverage, growth opportunities and foreign market presence when deciding their investment strategy (Gompers and Metrick 2001; Ferreira and Matos 2008; Dahlquist and Robertsson 2001).

Third, I control for tax planning opportunities for specific sub-sets of firms (PP&E, Intangibles, R&D expense and Equity income, Accounting standards). The tax treatment of depreciation and amortization produces substantial differences between accounting and taxable income of capital intensive firms (Manzon and Plesko 2002; Frank et al. 2009). Differences are also significant for firms largely dependent on intangibles and innovation and for firms with high equity income (Atwood, Drake, Myers, and Myers 2012; Hope et al. 2013). Finally, I include an indicator variable if a firm follows internationally recognized accounting standards (Accounting standards) to separate the effect of enhanced transparency from foreign institutional investors' monitoring (Aggarwal, Klapper, and Wysocki 2005; Chen et al. 2010). I also add year fixed effects in all model specifications. All control variables except for yearly fixed effects are lagged by one year.

2.3.7 Pairwise correlations

Table 2.2 presents pairwise Pearson correlation coefficients among the variables in my main analysis. In line with my hypothesis, the correlation coefficients for the associations between Foreign IO and Peer ETR Diff (Peer Cash ETR Diff) are positive and statistically (0.06 and 0.06, respectively) significant whereas Domestic IO is

negatively associated with Peer ETR Diff (Peer Cash ETR Diff) (-0.09 and -0.03, respectively). These correlations suggest that firms with larger foreign institutional ownership are more likely to set their tax rates close to the average tax rates of their country and industry peers. Moreover, consistent with a political cost prediction, large and profitable firms are more likely to mimic their peers' tax positions, as evidenced by the positive correlations between my two peer tax difference variables and Firm size and Pretax income, respectively.

2.3.8 Identification strategy

One source of concern that arises from estimating the effect of ownership structures on firms' tax policy is the potential endogeneity that such a relation may entail. For example, trading on unobservable private information, foreign institutions could invest in companies that are more likely to change their tax positions in the following years. If this is the case, results may reflect the ability of institutional investors to pick stocks and miss out the actual effect that I propose to estimate. I address this issue in two ways. First, I use an exogenous shock to foreign institutional ownership occurred around a regulatory change in Norway's insurance and pension fund industry that became effective in January 2008. The Act on Insurance Activity, passed in June 2005, eliminated the 35% equity investment restriction for securities held by Norwegian insurance companies and pension funds.[7] As shown in Figure 2.1, this change in the regulation led to a large mean (Panel A) and median (Panel B) increase in foreign equity investments by Norwegian insurance companies and pension funds from January 2008 onward (top-green line), while no significant impact was found on stocks held by other Norwegian institutional investors (bottom-orange line).

One affected fund was Norway's Government Pension Fund Global (GPFG). GPFG is the largest sovereign wealth fund in the world (The Economist 2011, Forbes 2019), with more than $1 trillion of assets under management (AUM), investing in

[7] Chapter 7, on pension undertakings, and Chapter 9, on life insurance activities, of the Act on Insurance Activity (Regulation of 10 June 2005 no.44) became law in January 2008 (Regulation of 17 December 2007 no. 1457) (OECD 2009). In the new regulation there are no longer quantitative restrictions on equity investments by Norwegian insurance companies and pension funds, but a greater emphasis is given to the Prudent Person Rule. I obtained information on insurance and pension fund regulation from the Norwegian Ministry of Finance and the Financial Supervisory Authority of Norway.

almost nine thousand companies in seventy-seven countries (CNBC 2017).[8] Legally, GPFG cannot invest in domestic companies; instead, it must hold foreign equities and debt securities (NBIM 2008). As a result of the Act, GPFG registered a sharp increase in equity investments from January 2008 onward, an increase in line with Figure 2.1 (NBIM 2017).

To provide a causal support to the effect of foreign institutional ownership, I exploit the increase in Norwegian pension fund and insurance ownership that followed the elimination of equity portfolio restrictions in January 2008 using a difference-in-differences (DID) design. In this setting, the treatment group consists of foreign firms held by Norwegian pension funds and insurance companies. The corresponding control group includes foreign firms held by Norwegian institutional investors other than pensions and insurances. Each company in the treatment group is matched based on a number of lagged (two years) covariates to companies in the control group using propensity score matching with replacement. I match on Foreign IO, Firm size, Leverage, Market-to-book, Pretax income, Equity income and Foreign sales, as well as industry classification. I assess covariate balance in Table 2.3, Panel A where I observe that, on average, foreign firms held by pension funds and insurance companies have comparable leverage, market-to-book value of equity, net property, plant and equipment, and research and development expense to the ones that are held by any other type of Norwegian institutional investors. However, they are statistically significantly different primarily in variables related to the size of the firm, such as market value of equity, pretax income, foreign sales and intangible assets and also closely held shares and the adoption of IFRS or US-GAAP as accounting standards. For new equity investments covariates are more balanced for treatment and control firms, with the exceptions of the variables net property, plant and equipment, foreign sales, closely held shares and accounting standards. It therefore becomes important that in my setting I control for those factors that may violate the random assignment assumption due to, for example, specific investors' tastes for large and profitable firms[9].

[8] Norges Bank Investment Management (hereafter, NBIM), a separate agency within the Norwegian central bank (i.e. Norges Bank), manages GPFG on behalf of the Norwegian Ministry of Finance.
[9] Untabulated tests also show that the pre-treatment parallel trend assumption is met.

Using data from 2006 to 2010, I estimate the following Probit model [2]:

$$\text{Peer Tax Diff}_{it} = \delta_0 + \delta_1 \text{Treated} \times \text{Post}_{it} + \delta_2 \text{Treated}_{it} + \delta_3 \text{Post}_{it} + \delta_4 \text{Firm size}_{it} + \delta_5 \text{Pretax income}_{it} + \Sigma \delta_i X_{it} + \delta_j \text{Year FE} + \varepsilon, \quad [2]$$

where Treated is one if a firm is in the treatment group and zero otherwise, Post is one from 2008 onwards and zero otherwise, and Treated × Post is the interaction term. Importantly, Equation [2] includes Firm size, Pretax income (my political cost proxy variables) and all remaining controls from Equation [1], addressing concerns related to potential covariate imbalances discussed above.

Second, I implement two-stage Probit regressions (IV Probit) using the inclusion of companies in the Morgan Stanley Capital International All Country World Index (MSCI ACWI)[10] as an instrumental variable (IV) for foreign institutional ownership. The MSCI ACWI is a global equity market index comprised of large and mid-cap securities across forty-nine countries (split between 24 developing and 25 developed economies). For each country, firms are ranked by their free-float-adjusted market capitalizations, and the top 85% for each country is included in the MSCI ACWI. Thus, firms enter or leave the index as they cross over the 85% threshold of market capitalization. Given that companies cannot exactly control their market capitalizations relatively to other companies, the shock to foreign institutional ownership that follows their inclusion or exclusion in the MSCI ACWI is considered as exogenous.

According to the MSCI website (https://www.msci.com/acwi), over $4.1 trillion of assets are benchmarked to the MSCI ACWI. Examples of funds indexed to the MSCI ACWI are Ivy Proshares NSCI ACWI Index Fund, iShares MSCI ACWI ETF, and BlackRock MSCI ACWI ex-U.S. IMI Ind Fund. Prior literature provides evidence that the addition or deletion of a firm to the MSCI ACWI affects its ownership structure (Aggarwal et al. 2011; Ferreira and Matos 2008). Specifically, Aggarwal et al. (2011) and Ferreira and Matos (2008) find that MSCI ACWI is a commonly used investment index for foreign institutional investors, whereas domestic institutional investors' portfolio compositions vary with local stock market indexes (Aghion, Van

[10] I obtain the list of MSCI ACWI constituents from Ferreira and Matos (2008) for the years 1998-2010 and from the MSCI Inc. for the years 2011-2015. I use MSCI constituents of year 2015 for year 2016 to make full use of my sample period in all tests and overcome data availability issues.

Reenen, and Zingales 2013; Khan et al. 2017). Anecdotally, Chinese A-share firms registered a significant price increase and inflow of foreign capital following the decision of MSCI Inc. to add Chinese A-shares to the index (Financial Times 2017).

Figure 2.2 highlights the significance of the inclusion in MSCI ACWI for foreign institutional investors' portfolio choices within my sample. Following the index inclusion rule, I plot foreign institutional ownership against the country-specific market capitalization ranking for 2015 (Panel A), which is the last year for Foreign IO in my sample, and for the entire period (Panel B). In both graphs, I observe a discontinuity around the 85% threshold, with a sharp decline in Foreign IO occurring at the break point.

To mitigate endogeneity concerns, I implement two-stage Probit regressions using MSCI membership as an instrumental variable (IV) for foreign institutional ownership (Foreign IO). Equation [3] represents my first-stage regression model:

$$\begin{aligned}\text{Foreign IO}_{it} = {} & \beta_0 + \beta_1 \text{MSCI membership}_{it} + \beta_2 \text{Domestic IO}_{it} + \\ & \beta_3 \text{Firm size}_{it} + \beta_4 \text{Pretax income}_{it} + \Sigma\beta_i X_{it} + \beta_j \text{Year FE} + \varepsilon, \end{aligned} \quad [3]$$

where MSCI membership is an indicator equal to one if a firm is included in the MSCI ACWI in the current year and zero otherwise and all other variables are previously defined. My second-stage regressions estimate the effect of foreign institutional ownership on tax planning using the predicted value of Foreign IO from the first-stage. Equation [4] shows the second-stage regression specification:

$$\begin{aligned}\text{Peer Tax Diff}_{it} = {} & \gamma_0 + \gamma_1 \widehat{\text{Foreign IO}}_{it-1} + \gamma_2 \text{Domestic IO}_{it-1} + \\ & \gamma_3 \text{Firm size}_{it-1} + \gamma_4 \text{Pretax income}_{it-1} + \Sigma\gamma_i X_{it-1} + \gamma_j \text{Year FE} + \varepsilon, \end{aligned} \quad [4]$$

where Peer Tax Diff_{it} is either Peer ETR Diff_{it} or Peer Cash ETR Diff_{it}, $\widehat{\text{Foreign IO}}_{it-1}$ is the predicted value of Foreign IO_{it-1} from the first-stage regression and all other variables are as previously defined.

2.4 Results

2.4.1 Norway's elimination of investing limits: Quasi-natural experiment

My first test takes advantage of the January 2008 regulatory change in Norway's insurance and pension fund industry, which eliminated the quantitative restriction of 35% of total portfolio share available for equity investments. I use difference-in-differences (DID) Probit models on Peer ETR Diff (Cash Peer ETR Diff) (Equation [2]) with a sample that only includes firms in treatment (foreign firms held by Norwegian insurance companies and pension funds) and control groups (foreign firms held by Norwegian institutional investors other than insurances and pensions). As Figure 2.1 Panels A and B show, the percentage of foreign equity held by institutions in the treatment group follow a similar trend to firms in the control group in the pre-treatment period (parallel-trend assumption), but show a markedly turn upward in the post-treatment period. All models include the control variables described in Equation [1].

Table 2.3 Panel B shows the effect of the regulatory change to foreign stocks held by Norwegian pension funds (treatment group) relative to those held by Norwegian institutional investors other than pensions (control group) using difference-in-differences Probit models. The coefficient estimates on Treated × Post in column (1) suggests that, following the elimination of portfolio restriction to Norwegian insurances and pension funds, treated firms are more likely to benchmark their taxes against their peers relative to firms in the control group. The marginal effect on Treated × Post is 0.057, indicating a 1-percent increase in Norwegian insurance and pension fund ownership leading to a higher probability of firms planning their taxes of about 6 percentage points relative to firms in the control group and after the change in the regulation.

In columns (2) and (3), I examine whether Norwegian insurance and pension fund ownership is associated with the firm being more tax aggressive (Low ETR Diff) or less tax aggressive (High ETR Diff). That is, is the "squeezing toward the middle" tax phenomenon I report in column (1) symmetric in both ends of the tax-paying spectrum or is it being fostered by one direction only? As columns (2) and (3) show, the coefficient on Treated × Post is negative and statistically insignificant for the regressions on Low ETR Diff and significantly negative for the regression on High

ETR Diff. This supports a symmetrical tax planning view – that is, firms experiencing an exogenous increase in foreign (Norwegian) institutional holdings are less likely to be in the extreme quintile of tax avoiders or tax payers. The marginal effect on Treated × Post, shown at the bottom of column (2) is 0.005 and statistically indistinguishable from zero. The marginal effect in column (3) is -0.050 and significant at 0.05 level.

Column (4) presents the results for my Peer Cash ETR Diff variable. The positive and significant coefficient on Treated × Post is consistent with the estimate reported in column (1). It indicates that after the elimination of portfolio restriction, investee firms of Norwegian insurances and pension funds are more likely to benchmark their taxes against their peers relative to firms held by other Norwegian institutional investors. Moreover, similar to the above analysis, columns (5) shows a negative but statistically insignificant coefficient on Treated × Post for the regressions on Low Cash ETR Diff whereas the coefficient is negative and significant at the 0.10 level in column (6) for High Cash ETR Diff. In line with the above analysis, this result suggests that firms plan their taxes away from the extremes following an exogenous increase in equity holdings by Norwegian insurances and pension funds.

Domestic IO has a negative coefficient on both Peer ETR Diff and Peer Cash ETR Diff, suggesting a moving away from the peer tax group for firms with larger domestic institutional holdings. The coefficient on Domestic IO is negative and statistically significant (insignificant) for the regression on Low ETR Diff (Low Cash ETR Diff), but it is significantly positive for the regressions on High ETR Diff and High Cash ETR Diff. This suggests that firms with high Domestic IO are less likely to use tax avoidance strategies relative to their peers. In contrast, they are more likely to bear higher ETRs and Cash ETRs relative to their peers, which could be a reflection of the stronger ties of domestic institutions with local business and governments (Giannetti and Laeven 2009).

The two political cost variables, Firm size (Pretax income) are significantly positive at the 0.01 levels in columns (1), (2) and (6) (all columns) and insignificant in columns (3), (4) and (5). These results are consistent with the premise that larger and more profitable firms are less willing to stand out in terms of tax planning, and therefore are more likely to mimic their country/industry peers (Zimmerman 1983; Watts and Zimmerman 1978). Leverage and growth opportunities (Market-to-book), are negatively associated with Peer ETR Diff, whereas Accounting standards is positively

associated with Peer ETR Diff. Foreign Sales present a significantly positive coefficient for the regressions on both Peer ETR Diff and Peer Cash ETR Diff. Results also hold whether I exclude the year in which the regulation change was implemented (2008).

In Panel C, I use a treatment sample that includes only new foreign equity investments of Norwegian pension funds. Similar to Panel B, coefficient estimates indicate that, following the elimination of portfolio restrictions to Norway's insurances and pension funds, treated companies are more likely to align their tax positions to their peers' tax rates relative to firms in the control group and move away from the extreme tax avoider and tax payer quintiles. Further, the regressions on both Peer ETR Diff and Peer Cash ETR Diff have significantly positive coefficients on Firm size and Pretax income, lending further support to the political cost hypothesis of tax planning.

2.4.2 Political costs hypothesis: Quasi-natural experiment

To further examine the political and reputational costs of tax avoidance faced by larger and more profitable firms, similar to Zimmerman (1983), I split the whole sample of 163,003 firm-year observations into large and small firms based on the median of Net revenues. Table 2.4, Panel A, shows that after this split treated and control groups consist of mainly (about 84%) large firms, which can also provide an explanation for the size-related imbalances found in Panel A of Table 2.3. In Panel B of Table 2.4, I re-run the difference-in-differences (DID) Probit models on each set of firms within each subsample, where the treatment group is foreign firms held by Norwegian insurance companies and pension funds and the control group includes foreign firms held by Norwegian institutional investors, other than insurances and pensions. Panel C includes only new foreign equity investments of Norwegian pension funds as a treatment group. According to the political cost theory of tax planning, the subsample of firms with the largest net revenues should be the ones most likely to be in the Peer ETR Diff (Peer Cash ETR Diff) group. Findings in Table 2.4 are consistent with these predictions.

First, I note that in Panel B the interactive terms Treated × Post is positive and statistically significant at the 0.01 level for the regression on Peer ETR Diff (column (1)) and at the 0.05 level for the regression on Peer Cash ETR Diff (column (4)) for the subsample including large firms only, while they are statistically insignificant in columns (1) and (4) for small firms. Similarly, in Panel C the interactive terms on Peer

ETR Diff (column (1)) and Peer Cash ETR Diff (column (4)) are positive and statistically significant at the 0.01 and 0.05 levels, respectively, for larger firms. As in panel B, all interactive terms on Peer ETR Diff (column (1)) and Peer Cash ETR Diff (column (4)) are statistically insignificant for the subsample of small firms. Results from all the other columns (2, 3, 5 and 6) of both Panels B and C suggest that firms are less likely to adopt aggressive tax avoidance positions or paying too much taxes.

These results are consistent with those reported in Table 2.3, adding further credence to a theory of large firms being exposed to greater political costs of tax avoidance (Watts and Zimmerman 1978; Zimmerman 1983), thereby adopting a more effective peer-benchmarked tax planning strategy.

2.4.3 MSCI assignment: Instrumental variable approach

Table 2.5 presents the results using Probit regressions of the effect of foreign institutional ownership (Foreign IO) on corporate tax planning. Panel A presents results with ETR Diff measures and Panel B has my findings using Cash ETR Diff measures.

I begin by presenting a Probit model on Peer ETR Diff using all institutional ownership (IO) as an independent variable. Previous studies show a positive correlation between tax avoidance for U.S. companies and institutional ownership (Chen et al. 2010; Cheng et al. 2012; Khan et al. 2017; Chen et al. 2018). These studies do not categorize institutions as foreign or domestic; nor do they use an international setting of firms. My first question, then, is whether my international data yields results similar to these papers. As column (1) shows, the coefficient on IO is significantly negative, suggesting that larger equity investments by institutional investors, on average, are associated with firms being less likely to move their ETRs towards their country/industry peers. These findings are consistent with prior studies.

In column (2), I separate institutional ownership into foreign (Foreign IO) and domestic (Domestic). With this dichotomy, the coefficient on Foreign IO is significantly positive, whereas the coefficient on Domestic IO is significantly negative. The positive coefficient on Foreign IO is consistent with larger equity investments by foreign institutions in time t-1 being associated with a greater probability of firms planning their taxes in line with their peers. The marginal effect on Foreign IO, shown at the bottom of column (2), indicates that a 1-percent increase in foreign institutional

ownership is associated with an increase of 6 percentage points in the probability of a firm being in the peer tax group in year t. This result is in line with the effect I find in Table 2.3, Panel B, of firms squeezing their taxes towards the middle.

In columns (3) and (4), I present the first and second stage results of my IV Probit regression using inclusion in the MSCI ACWI (MSCI membership) as an instrumental variable (IV) for foreign institutional ownership (equations 2 and 3). First stage results are presented in in column (3). They show that firms experience an increase in Foreign IO of 5.31%, on average, following their addition to MSCI ACWI. Moreover, Foreign IO is positively associated with size (Firm size), growth opportunities (Market-to-book), profitability (Pretax income), PP&E, Intangibles, Foreign sales, and the use of internationally recognized Accounting standards. By contrast, firms that experience an increase in Closely-held-shares, Domestic IO and Equity income are associated with a reduction of Foreign IO in the following period.

Column (4) reports the second stage results. Consistent with the non-IV Probit result in column (2), the coefficient estimate on Foreign IO is positive and significant, meaning that firms with larger foreign institutional ownership in year t-1 are more likely to select tax positions in year t that do not stand far from their peers' tax rate. The marginal effect indicates that a 1-percent increase in Foreign IO from year t-1 is associated with an increase in the probability of the firm being in its country/industry peer tax quintile by 29 percentage points. Differences in coefficient estimates between columns (2) and (4) could reflect the ability of foreign institutions to target firms that currently do not plan their taxes or engage in excessive tax avoidance, but may change their tax policy in the following years. If this is the case, my IV Probit regressions are more likely to provide unbiased coefficient estimates of the effect of Foreign IO compared to Probit regressions. Domestic IO has a negative coefficient, suggesting a moving away from the peer tax group in year t for firms with larger domestic institutional holdings in year t-1.

My two political cost variables, Firm size and Pretax income are significantly positive at the 0.01 levels in columns (1), (3) and (4). These results are consistent with the premise that larger and more profitable firms are less willing to stand out in terms of tax planning, and therefore are more likely to mimic their country/industry peers (Zimmerman 1983, Watts and Zimmerman 1978). The coefficient on Firm size ranges from 0.0551 in column (4) to 0.0677 in column (1); the coefficient on Pretax income

ranges from 0.7865 in column (4) to 0.8048 in column (1). The tight range of these coefficients across specifications is consistent with my political cost proxies being robust across models. Leverage, growth opportunities (Market-to-book), R&D expense and Intangibles are negatively associated with Peer ETR Diff, whereas Equity Income and Accounting standards are positively associated with Peer ETR Diff.

Next, I examine whether foreign institutional ownership in year t-1 is associated with the firm being more tax aggressive (Low ETR Diff) or less tax aggressive (High ETR Diff) in year t. As columns (5) and (6) show, the coefficients on Foreign IO are significantly negative for the IV Probit regressions on Low ETR Diff and on High ETR Diff. This overall supports the view that firms symmetrically plan their taxes away from both ends of the tax-paying spectrum – that is, firms with higher foreign institutional holdings in year t-1 are less likely to be in the extreme quintile of tax avoiders or tax payers. The marginal effect on Foreign IO, shown at the bottom of columns (5), and (6) are -0.8198 and -0.3813, respectively.

In contrast, the coefficient on Domestic IO is negative on the IV Probit model on Low ETR Diff, but it is positive for the IV Probit model on High ETR Diff. This suggests that firms with high Domestic IO are less likely to use tax avoidance strategies relative to their peers. In contrast, they are more likely to bear higher ETRs relative to their peers, which could be a reflection of the stronger ties of domestic institutions with local business and governments.

Consistent with political cost theory, larger and more profitable firms are less likely to engage in extreme tax avoidance, as evidenced by the negative coefficients on Firm size and Pretax income in column (5). Similarly, larger and more profitable firms are more likely to be extreme taxpayers (column 6), although the positive coefficient on Pretax Income could be a reflection of more profitable firms being in higher tax brackets, thus paying more taxes.

In Panel B, I use Cash ETR Diff quintiles as the dependent variable in lieu of ETR Diff. The empirical results using cash measures of income tax rates are very similar to those reported in Panel A. Columns (1) through (4) examine peer effects, while columns (5) and (6) examine the probability of being in the extreme tax avoider quintile or the extreme taxpayer quintile. In columns (2) and (4), the Probit and IV Probit produce significantly positive coefficients on Foreign IO, suggesting a positive association between last period's foreign institutional ownership and this year's

probability of a firm being in Peer Cash ETR Diff. The negative coefficients on Foreign IO in columns (5) and (6) are consistent with those found in Panel A, supporting the view that firms with larger foreign institutional holdings are less likely to be extreme tax avoiders or payers in the next year, i.e., they move towards their peers from either direction.

Similar findings are found for Domestic IO in Panel B when compared to Panel A, with the exception of an insignificantly positive coefficient in column (4). Of equal note, the coefficient on IO, total institutional holdings, in column (1) is insignificantly different from zero in Panel B, whereas it is significantly negative in Panel A.

With respect to the political cost proxies, Firm size and Pretax income, I see the same significantly positive coefficients on both variables when estimated on Peer Cash ETR as I saw in Panel A. These coefficients are consistent with larger and more profitable firms not wishing to stand out in the tax rate arena. Similarly, Firm size and Pretax income are negatively related to the firm being in the extreme tax avoidance quintile (column 5) but positively related to the firm being in the extreme tax payer quintile (column 6).

Thus, findings are robust across both measures of effective tax rates.

2.4.4 Political costs hypothesis: Instrumental variable approach

To further examine the political and reputational costs of tax avoidance faced by larger and more profitable firms, similar to Zimmerman (1983), I divide the whole sample of 163,003 firm-year observations into quartiles based on Net revenues and then match treatment with control companies. I test my hypotheses on a sample that includes only treated and control firms. In Table 2.6, Panel A, I re-run the IV Probit models on Peer ETR Diff, Low ETR Diff, and High ETR Diff on each set of firms within each quartile. In Panel B, I re-run the IV models using the Cash ETR Diff variables instead. According to the political cost theory of tax planning, the quartile of firms with the largest net revenues should be the quartile most likely to be in the Peer ETR Diff group and the least likely to be among the most aggressive tax avoiders (Low ETR Diff). Findings in Table 2.6 are consistent with these predictions.

First, I note that in both Panels A and B, Foreign IO is significantly associated with the IV, MSCI membership, for all four quartiles. Second, in Panel A, the coefficient estimates for Foreign IO are significantly positive for the second-stage Probit model

on Peer ETR Diff for the first two quartiles only, and they turn statistically insignificant in the two quartiles with the smallest firms. Similarly, in Panel B only the first two quartiles of largest stocks produce a significantly positive coefficient on Peer Cash ETR Diff. Third, the coefficient on Foreign IO is significantly negative in the first quartiles for the second-stage Probit model on Low ETR Diff and Low Cash ETR Diff in Panels A and B, respectively. Thus, only the largest companies in firm size are more likely to shun tax avoidance. Finally, I note a significant negative coefficient on Foreign IO for the quartile of smallest firms for the regressions on High ETR Diff and High Cash ETR Diff. These smallest firms are less likely to be in the high payer quartile of firms.

These results are consistent with those reported in Table 2.5. Chapter 2 thus provide further evidence to a theory of large firms being exposed to greater political costs of tax avoidance (Watts and Zimmerman 1978; Zimmerman 1983), which is arguably associated to a more effective peer-benchmarked tax planning strategy. As an added test, I split the firms into quartiles based on Firm size. Results (untabulated) are similar to those reported in Table 2.6.

2.4.5 Foreign institutional ownership and corporate governance

Previous studies show that both CEO overconfidence (Chyz, Gaertner, Kausar, and Watson 2014; Kubick and Lockhart 2017) and indexer institutional ownership (Chen et al. 2018) cause CEOs or their firms to engage in more aggressive tax avoidance. The latter paper finds this effect to be stronger for firms with weaker corporate governance, as proxied by high G-indices and low executive equity incentives. Chen et al. (2018) regard at tax avoidance as being desirable to institutional owners. In contrast, Khurana and Moser (2013) find that long-term institutional ownership reduces tax aggressiveness in firms with high G-indices. They view tax avoidance as an opportunity for managerial rent-extraction, taking an opposite view of Chen et al. (2018). Both papers view institutional ownership as having a mitigating effect on CEO opportunistic behaviour, albeit in different directions with respect to tax aggressiveness.

I examine whether foreign institutional investors act as effective monitors of firms' tax planning choices in firms with weaker corporate governance structures. Unlike the previous papers, I propose that being in the peer group by country/industry is the

most desirable tax position for the firm. I test my prediction by including two measures indicative of corporate governance weaknesses: CEO power and Low incentive compensation. CEO power is an indicator if the CEO is also the Chairman of the Board and has tenure at the firm above the sample mean. Low incentive compensation is a variable indicating whether the ratio of incentive-based compensation over total compensation is below the median at a country-level. I calculate incentive compensation as the sum of bonuses and stocks awarded at the end of each financial year.[11] I interact Foreign IO with each variable. A positive coefficient on the interactive term is consistent with foreign institutions acting as effective monitors of strong CEOs; a negative coefficient is consistent with the opposite effect.

Table 2.7 contains the empirical results. As column (1) shows, firms with powerful CEOs are less likely to peg their tax rates to their peer firms, as evidenced by the negative coefficient on CEO power. However, the coefficient on the interactive variable Foreign IO × CEO power is significantly positive, thereby indicating that the effect of foreign institutional ownership on peer tax planning mitigates this negative influence. The results are similar in column (2) for Peer Cash ETR Diff. In column (3), I find a similar negative coefficient on Low incentive compensation, indicating that firms with a lower alignment of interests between managers and shareholders are less likely to mimic their country and industry tax peers. However, the positive and significant coefficient on the interactive variable Foreign IO × Low incentive compensation in column (3) supports the view that foreign institutional ownership reduces this negative effect.[12] Results in column (4) for Peer Cash ETR Diff are similar to the ones in column (3). Overall, the results in Table 2.6 provide evidence that foreign institutional investors are more likely to monitor corporate tax policies when managers have a stronger position within the firm or there is a lower alignment of their interests and those of the shareholders.

2.4.6 Additional analyses

[11] Low incentive compensation does not include stock options. Despite significantly affecting managerial risk-aversion, information about this pay structure across multiple countries is subject to data availability issues and could substantially reduce the number of firm-year observations in my international sample.

[12] In columns 3 and 4, I drop Close and FxSales because of their collinearity with CEO power and Low incentive compensation.

To further validate my findings and provide additional support to my research strategy, in Table 2.8, I repeat my IV Probit regression analysis using a sample restricted to the 10% bandwidth of the stocks around the threshold for inclusion in the MSCI ACWI, i.e., firms 5% below and 5% above (inclusive) the 85% cut-off point of total (free-float) country-level market capitalization ranking. This analysis is analogous to studies using a regression discontinuity design in that it limits my sub-sample to firms with similar underlying traits (Khan et al. 2017; Chen et al. 2018). Results remain similar to the ones presented in Table 2.3, Panel A for ETR (columns 2-4). For Cash ETRs the direction of effects of Foreign IO on tax planning are similar to the ones presented in Table 2.3, Panel B but they are statistically insignificant for Peer Cash ETR Diff (column 6) and High Cash ETR Diff (column 8).

I conduct additional tests to gain further insights in the mechanisms through which foreign institutional investors relate to their investee firms' tax policy. I repeat my analysis focusing on several investor and firm-level characteristics that could impact on tax-related decision making. First, I examine whether the investment horizon of foreign investors impacts on peer effects in tax planning. Prior literature indicates that long-term investors have stronger incentives to be better monitors of corporate activity compared to short-term ones (Gaspar, Massa, and Matos 2005; Harford, Kecskés, and Mansi 2018). Specifically for foreign investors, prior studies show a more pronounced effect of long-term oriented foreign institutional owners on innovation and investments in human capital, capital expenditure and R&D (Bena et al. 2017) and on improved voluntary disclosure (Tsang et al. 2019). Based on my argument that the peer group by country/industry is the most desirable tax position for the firm, I expect a more pronounced peer effect on tax planning for long-term foreign investors. For this reason, I classify foreign investors based on their investment horizons using the methodology from Gaspar et al. (2005) and repeat the analysis after splitting foreign investors into long-term and short-term oriented.[13]

Second, I examine whether the legal origin of the investor's domicile country impacts on the investee firm's tax planning. Prior studies show that investors from countries with common law legal origins are exporters of good governance practices to their investee firms (Aggarwal et al. 2011; Bena et al. 2017). For this reason, I am

[13] More information on how I classify foreign investors based on investment horizons is provided in the Appendix.

motivated to examine whether this is also relevant for peer effects in tax planning; I split foreign investors into common and civil law based on their country of origin, following the classification by LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1998), and I examine whether investors from common law countries are more strongly related to peer effects in tax planning for their portfolio firms in countries with weak investor protection. Finally, since a large part of my sample includes U.S. firms, I repeat the analysis splitting it between Non-U.S. and U.S. firms.

Table 2.9 reports the empirical results. Panel A shows a more pronounced peer effect on tax planning for long-term oriented foreign investors. Column (2) shows that Foreign IO LT is positive and statistically significant, while it is positive but insignificant for Foreign IO ST. Also the coefficients in columns (3) and (4) are negative and statistically significant at the 0.01 level for Foreign IO LT, indicating that in the presence of long-term foreign institutional investors firms are less likely to stand out in their tax planning compared to their peers. For Foreign IO ST, I find less pronounced (column (3)) or statistically insignificant (column (4)) coefficients. In columns (6) to (8), I find similar findings for my cash-based tax measures.

My findings contribute Aggarwal et al. (2011) by showing, in Panel B, that following an increase in foreign institutional holdings from common law countries, firms domiciled in countries with weaker investor protection legislations are more likely to select a tax position similar to their peers, and away from more aggressive or lax tax strategies. I proxy for investor protection legislation using the anti-self-dealing index developed by Djankov, LaPorta, Lopez-de-Silanes, and Shleifer (2008) and common law countries are defined by LaPorta et al. (1998). Panel C shows similar results to Table 2.5, when I split my sample between U.S. and non-U.S. firms.

2.4.7 Other robustness tests

One concern of my research design is that firms operating in the same industries and constantly reporting losses could drive my results of peer effects in tax planning. Panel A of Table 2.9 presents the results of my main analysis on a sample of firm-year observations with non-negative pre-tax income. The effect of Foreign IO on peer planning is similar across all my specifications to those presented in the main analysis. That is, firms are more likely to select a tax position that is consistent with their peers following an exogenous increase in Foreign IO. Moreover, similar to my main analysis,

firms with greater Foreign IO are less likely to over-invest (Low ETR Diff and Low Cash ETR Diff) or under-invest (High ETR Diff and High Cash ETR Diff) in tax planning compared to their peers. Therefore, firms experiencing losses do not seem to be driving my results.

To account for the undue influence of one or two firm-year observations, I re-do my analysis using three-year rolling means for all my variables except those computed as indicators (MSCI membership and Accounting standards). Panel B of Table 2.9 shows that the main results are consistent in both specifications. Foreign IO is positively associated with Peer ETR Diff and negatively associated with Low ETR Diff and High ETR Diff. Moreover, similarly to my main results, Domestic IO is negatively associated with Peer ETR Diff and Low ETR Diff and positively associated with High ETR Diff.

The analysis in chapter 2 has so far found evidence of peer effects among companies operating in the same industry and domiciled in the same country (industry and country peers), but it has not tested the existence of an international peer effect mechanism. Yet, Graham et al. (2011) suggest that firms tend to benchmark their tax positions against the tax rates of firms operating in the same industry and that this comparison also extends across different jurisdictions. To test the hypothesis of an international peer effect in corporate tax planning, I construct an alternative peer definition based on industry (using on Fama-French 48 industry classification) and size (industry-adjusted total assets) (see Armstrong et al. 2015). Panel C of Table 2.9 presents the results of my regressions using this alternative peer definition. Consistent with my main analysis, results indicate that the probability of firms selecting a tax position close to those of its peers (Peer ETR Diff and Peer Cash ETR Diff) increases following an exogenous increase in Foreign IO.

2.5 Concluding remarks

I use a comprehensive sample of about 26,000 publicly listed companies from 48 countries to examine the effects of foreign institutional investors on corporate tax planning. My research design exploits two sources of exogenous shocks to foreign institutional ownership - the addition to the Morgan Stanley Capital International - All Country World Index (MSCI ACWI) and the elimination of portfolio restrictions to Norwegian insurance companies and pension funds. I show that firms with higher

foreign institutional ownership are more likely to engage in a level of tax planning that is the most similar to that of their peers. My results overall suggest that the impact of foreign institutional investors on corporate tax planning activities is through a monitoring channel. This indicates that, unlike anecdotal evidence, foreign institutions act as effective corporate monitors of shareholders' interests, as their presence is associated with a more effective tax planning especially in firms with unresolved governance issues. In chapter 2, I also present evidence consistent with a political cost view of tax planning – that is, I find evidence that larger and more profitable firms are more likely to imitate their peer country/industry firms.

APPENDIX

Table A.2.1. Variable Descriptions

Variable	Description
Tax planning variables	
ETR Diff	Difference between a firm's ETR and the average ETR of its country and industry (Fama-French 48 industry classification) peers. ETR is calculated as income taxes (Worldscope 1451) divided by pre-tax income (Worldscope 1401)
Peer ETR Diff	Indicator variable equal to one if ETR Diff is zero or close to zero (third quintile of the ETR Diff distribution); and zero otherwise
Low ETR Diff	Indicator variable equal to one if ETR Diff is the largest negative difference (first quintile of the ETR Diff distribution); and zero otherwise
High ETR Diff	Indicator variable equal to one if ETR Diff is the largest positive difference (fifth quintile of the ETR Diff distribution); and zero otherwise
Cash ETR Diff	Difference between a firm's Cash ETR and the average Cash ETR of its country and industry (Fama-French 48 industry classification) peers. Cash ETR is calculated as income taxes paid as from the cash flow statement (Worldscope 4150) divided by pre-tax income (Worldscope 1401)
Peer Cash ETR Diff	Indicator variable equal to one if Cash ETR Diff is zero or close to zero (third quintile of the Cash ETR Diff distribution); and zero otherwise
Low Cash ETR Diff	Indicator variable equal to one if Cash ETR Diff is the largest negative difference (first quintile of the Cash ETR Diff distribution); and zero otherwise
High Cash ETR Diff	Indicator variable equal to one if Cash ETR Diff is the largest positive difference (fifth quintile of the Cash ETR Diff distribution); and zero otherwise
Institutional ownership variables	
IO	For each firm, sum of the holdings of all institutions divided by the firm's market capitalization (Factset LionShares)
Foreign IO	For each firm, sum of the holdings of all institutions that are located in a different country to the one in which the firm is listed divided by the firm's market capitalization (Factset LionShares)
Domestic IO	For each firm. sum of the holdings of all institutions that are located in the same country in which the firm is listed divided by the firm's market capitalization (Factset LionShares)
Political cost variables	
Firm size	Natural logarithm of period-close market price (Worldscope 5085) multiplied by common shares outstanding current (Worldscope 5301)
Pretax income	Pre-tax income (Worldscope 1401) divided by total assets (Worldscope 2999)
Net revenues	Natural logarithm of net sales or revenues in U.S. dollars (Worldscope 7240)
Control variables	
Closely-held-shares	Closely-held-shares as a percentage of total shares (Worldscope 8021) divided by one hundred
Leverage	Total debt (Worldscope 3255) divided by total assets (Worldscope 2999)
Market-to-book	Period-close market price (Worldscope 5085) multiplied by common shares outstanding (Worldscope 5301) divided by total assets (Worldscope 2999)
PP&E	Net property, plant and equipment (Worlscope 2501) divided by total assets (Worldscope 2999)
R&D expense	Research and development expense (Worldscope 1201) divided by total assets (Worldscope 2999)
Equity income	Equity income from unconsolidated subsidiaries (Worldscope 1503) divided by total assets (Worldscope 2999)

Intangibles	Net intangibles (Worldscope 2649) divided by total assets (Worldscope 2999)
Foreign sales	Foreign sales as a percentage of total sales (Worldscope 8731) divided by one hundred
Accounting standards	Indicator variable equal to one if accounting standards (Worldscope 7536) are IFRS or US GAAPs; and zero otherwise
Index membership variables	
MSCI membership	Indicator variable equal to one if a firm is included in the Morgan Stanley Capital International All Country World Index (MSCI ACWI) (MSCI Inc. and Bena et al. 2017); and zero otherwise
Below cut-off	Indicator variable equal to one if a firm's free-float adjusted market capitalization ranking is lower or equal to 85% of the total market capitalization in each country; and zero otherwise
Corporate governance variables	
CEO power	Indicator variable equal to one if a CEO is also Chairman and has a long-term tenure (appointment period longer than the sample mean); and zero otherwise (BoardEx)
Low incentive comp.	Indicator variable equal to one if the ratio incentive compensation to total compensation is below the median calculated at country-level; and zero otherwise. Incentive compensation is the sum of bonuses and stocks awarded at the end of the period (BoardEx)
Other ownership variables	
Foreign IO LT	For each firm, sum of the holdings of long-term foreign institutions divided by the firm's market capitalization (Factset LionShares). Following Gaspar et al. (2005), long-term foreign institutions have a portfolio turnover below the country-, year-median.
Foreign IO ST	For each firm, sum of the holdings of short-term foreign institutions divided by the firm's market capitalization (Factset LionShares). Following Gaspar et al. (2005), short-term foreign institutions have a portfolio turnover above the country-, year-median.
Foreign IO Common	For each firm, sum of the holdings of foreign institutions domiciled in English common law countries, as defined by LaPorta et al. (1998), divided by the firm's market capitalization (Factset LionShares).

TABLES

Table 2.1. Summary Statistics

Quintile statistics of ETR Diff and Cash ETR Diff (Panel A) and summary statistics of tax and institutional ownership by country (Panel B), industry (Panel C) and by tax planning quintiles. Values in Panels B and C represent sample means with the exception of N (equal to number of observations) and Peers (equal to median number of observations per country (Panel A) and industry (Panel B) peers).

Panel A: Quintile Distribution of Tax Planning Variables

		ETR Diff					Cash ETR Diff			
Quintile	Variable	Mean	Median	Min	Max	Variable	Mean	Median	Min	Max
First	Low ETR Diff	-0.24	-0.23	-0.74	-0.18	Low Cash ETR Diff	-0.25	-0.24	-1.00	-0.18
Second	-	-.0.12	-0.12	-0.18	-0.06	-	-.0.14	-0.14	-0.18	-0.10
Third	**Peer ETR Diff**	**-0.01**	**-0.01**	**-0.06**	**0.04**	**Peer Cash ETR Diff**	**-0.05**	**-0.05**	**-0.10**	**0.01**
Fourth	-	0.08	0.08	0.04	0.13	-	0.07	0.07	0.01	0.14
Fifth	High ETR Diff	0.29	0.20	0.13	0.98	High Cash ETR Diff	0.37	0.28	0.13	1.00

Panel B: Summary Statistics by Country

	N	ETR	ETR Diff	Cash ETR	Cash ETR Diff	Foreign IO	Domestic IO
Australia	6,341	0.18	-0.01	0.24	0.00	0.05	0.02
Austria	422	0.24	0.00	0.22	-0.01	0.11	0.02
Belgium	623	0.23	0.00	0.21	-0.00	0.08	0.03
Bermuda	139	0.09	-0.13	0.06	-0.15	0.14	0.12
Brazil	502	0.24	0.00	0.14	-0.10	0.13	0.03
Canada	6,942	0.19	-0.00	0.16	-0.01	0.11	0.14
Cayman Islands	64	0.14	-0.09	0.15	-0.08	0.04	0.06
Chile	362	0.22	-0.01	0.20	-0.02	0.03	0.01
China	5,860	0.19	-0.00	0.39	0.05	0.04	0.02
Colombia	78	0.26	0.04	0.25	0.05	0.02	0.00
Czech Republic	66	0.22	-0.00	0.20	-0.02	0.08	0.01
Denmark	384	0.21	-0.01	0.21	-0.00	0.07	0.10
Egypt	279	0.19	-0.04	0.23	0.01	0.03	0.00
Finland	589	0.23	0.02	0.22	0.01	0.10	0.12
France	5,105	0.28	0.02	0.24	0.01	0.06	0.05
Germany	3,128	0.25	-0.00	0.23	-0.01	0.08	0.04
Greece	797	0.25	0.02	0.24	0.02	0.06	0.00
Hong Kong	7,884	0.15	-0.03	0.14	-0.03	0.05	0.01
Hungary	104	0.17	-0.05	0.17	-0.05	0.12	0.01
India	7,763	0.25	0.00	0.24	0.00	0.04	0.05
Indonesia	797	0.24	0.02	0.27	0.05	0.04	0.00
Ireland	549	0.14	-0.09	0.15	-0.06	0.25	0.01
Israel	1,232	0.17	-0.02	0.15	-0.04	0.14	0.02
Italy	986	0.32	0.09	0.34	0.11	0.06	0.02
Japan	16,672	0.37	0.02	0.35	0.01	0.04	0.03
Korea	4,248	0.22	0.01	0.22	-0.01	0.05	0.00
Luxembourg	103	0.20	-0.01	0.18	-0.01	0.17	0.01
Malaysia	4,918	0.22	-0.01	0.23	-0.01	0.03	0.01
Mexico	274	0.28	0.06	0.24	0.02	0.09	0.02
Morocco	153	0.30	0.07	0.28	0.08	0.01	0.00
Netherlands	1,291	0.22	-0.01	0.20	-0.02	0.21	0.05
New Zealand	753	0.26	0.03	0.28	0.05	0.05	0.02
Norway	847	0.22	-0.02	0.18	-0.03	0.09	0.11
Peru	84	0.30	0.08	0.29	0.08	0.06	0.01
Philippines	592	0.23	-0.02	0.20	-0.02	0.05	0.00
Poland	1,426	0.19	-0.02	0.19	-0.02	0.03	0.19
Portugal	244	0.25	0.01	0.24	0.02	0.04	0.03
Russia	503	0.26	0.01	0.30	0.05	0.11	0.00
Singapore	3,661	0.18	-0.01	0.18	-0.02	0.04	0.01
South Africa	1,813	0.28	0.05	0.28	0.02	0.07	0.06
Spain	917	0.23	0.00	0.22	0.00	0.07	0.04
Sweden	1,034	0.22	-0.00	0.20	-0.01	0.07	0.17
Switzerland	902	0.19	-0.03	0.19	-0.02	0.11	0.08
Taiwan	2,915	0.17	-0.02	0.16	-0.03	0.04	0.01
Thailand	678	0.17	-0.05	0.18	-0.03	0.04	0.01
Turkey	1,480	0.19	-0.03	0.18	-0.03	0.04	0.00
United Kingdom	14,050	0.21	-0.00	0.20	-0.00	0.05	0.18
United States	52,473	0.21	0.00	0.19	-0.00	0.04	0.48
Overall	163,003	0.23	0.00	0.23	0.00	0.05	0.19

Panel C: Summary Statistics by Industry

	N	ETR	ETR Diff	Cash ETR	Cash ETR Diff	Foreign IO	Domestic IO
Unclassified	369	0.28	0.04	0.27	0.01	0.05	0.21
Agriculture	1,404	0.23	-0.01	0.22	-0.02	0.05	0.09
Food Products	4,259	0.26	0.00	0.26	0.00	0.04	0.12
Candy & Soda	894	0.28	0.01	0.27	-0.01	0.07	0.10
Beer & Liquor	1,135	0.27	0.04	0.31	0.06	0.07	0.11
Tobacco Products	241	0.31	0.08	0.33	0.09	0.11	0.19
Recreation	822	0.23	-0.02	0.22	-0.02	0.04	0.19
Printing & Publishing	1,596	0.26	0.01	0.24	0.02	0.05	0.21
Consumer Goods	2,983	0.26	0.00	0.26	0.00	0.06	0.18
Apparel	1,974	0.26	0.01	0.25	0.01	0.04	0.18
Medical Equipment	4,143	0.17	-0.01	0.18	-0.01	0.06	0.29
Pharmaceutical Products	7,459	0.15	-0.00	0.20	0.00	0.07	0.22
Chemicals	5,133	0.25	-0.00	0.27	0.00	0.04	0.16
Rubber & Plastic Products	1,377	0.25	0.02	0.25	0.02	0.04	0.17
Textiles	1,430	0.24	-0.01	0.23	-0.01	0.03	0.08
Construction Materials	5,268	0.25	-0.00	0.25	0.01	0.05	0.14
Construction	7,931	0.27	0.00	0.26	-0.00	0.05	0.09
Steel Works Etc.	3,837	0.24	-0.00	0.24	-0.01	0.04	0.13
Fabricated Products	660	0.26	0.04	0.24	0.03	0.03	0.16
Machinery	5,537	0.26	-0.00	0.26	-0.00	0.05	0.22
Electrical Equipment	1,054	0.21	-0.01	0.22	-0.01	0.06	0.11
Automobiles & Trucks	3,930	0.26	-0.00	0.26	0.01	0.05	0.18
Aircrafts	715	0.27	0.02	0.21	-0.01	0.05	0.32
Shipbuilding, Railroad Equip.	501	0.23	0.02	0.21	-0.01	0.05	0.16
Defense	151	0.25	0.01	0.23	-0.00	0.01	0.44
Precious Metals	2,867	0.11	-0.01	0.13	-0.00	0.12	0.07
Non-Metallic & Industr. Metal	3,058	0.15	0.00	0.19	0.01	0.08	0.08
Coal	880	0.17	-0.01	0.20	-0.01	0.04	0.14
Petroleum & Natural Gas	7,067	0.21	-0.00	0.17	-0.00	0.07	0.21
Communication	4,834	0.22	0.00	0.19	0.01	0.06	0.18
Personal Services	6,643	0.25	-0.00	0.22	-0.00	0.04	0.24
Business Services	23,068	0.21	-0.01	0.20	-0.01	0.05	0.24
Computers	8,738	0.22	-0.00	0.22	-0.01	0.05	0.19
Electronic Equipment	10,185	0.18	-0.00	0.17	-0.01	0.06	0.24
Measuring & Control Equip.	2,803	0.21	-0.01	0.22	-0.00	0.05	0.32
Business Supplies	1,904	0.25	-0.01	0.24	0.00	0.05	0.18
Shipping Containers	565	0.27	0.00	0.24	0.00	0.05	0.20
Transportation	5,679	0.23	-0.01	0.21	-0.00	0.06	0.18
Wholesale	6,926	0.27	0.00	0.27	0.01	0.04	0.18
Retail	8,855	0.29	0.00	0.28	0.01	0.06	0.23
Restaurants, Hotels & Motels	4,128	0.26	0.02	0.23	0.02	0.04	0.22
Overall	163,003	0.23	0.00	0.23	0.00	0.05	0.19

Table 2.2. Pairwise Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	Peer ETR Diff	1.00														
(2)	Peer Cash ETR Diff	**0.18**	1.00													
		(0.00)														
(3)	Foreign IO	**0.06**	**0.06**	1.00												
		(0.00)	(0.00)													
(4)	Domestic IO	**-0.09**	**-0.03**	**-0.03**	1.00											
		(0.00)	(0.00)	(0.00)												
(5)	Closely-held-shares	**0.06**	**0.02**	**-0.20**	**-0.46**	1.00										
		(0.00)	(0.00)	(0.00)	(0.00)											
(6)	Firm size	**0.18**	**0.08**	**0.23**	**-0.02**	**0.03**	1.00									
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)										
(7)	Pretax income	**0.14**	**0.09**	**0.10**	**0.09**	**0.07**	**0.35**	1.00								
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)									
(8)	Market-to-book	**-0.02**	**0.02**	**0.01**	**0.03**	**-0.07**	**-0.02**	**-0.35**	1.00							
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)								
(9)	Leverage	**-0.06**	**-0.04**	**-0.02**	0.00	0.01	**-0.02**	**-0.22**	**-0.10**	1.00						
		(0.00)	(0.00)	(0.00)	(0.56)	(0.01)	(0.00)	(0.00)	(0.00)							
(10)	PP&E	**0.03**	**0.03**	**0.02**	**-0.10**	**0.06**	**0.13**	**0.08**	**-0.17**	**0.23**	1.00					
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)						
(11)	R&D expense	**-0.09**	**-0.03**	**-0.03**	**0.08**	**-0.16**	**-0.20**	**-0.46**	**0.34**	**-0.04**	**-0.24**	1.00				
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)					
(12)	Equity income	**0.01**	**0.02**	**0.01**	-0.01	**0.02**	**0.06**	**0.06**	**-0.04**	-0.00	-0.00	**-0.06**	1.00			
		(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.63)	(0.15)	(0.00)				
(13)	Intangibles	**-0.07**	**-0.04**	**0.07**	**0.26**	**-0.18**	**-0.16**	**-0.03**	**-0.01**	**0.08**	**-0.36**	**0.01**	**-0.04**	1.00		
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
(14)	Foreign sales	**0.03**	**0.04**	**0.21**	-0.00	**-0.07**	**0.01**	**0.07**	**-0.06**	**-0.04**	**-0.07**	**0.04**	**0.04**	**0.06**	1.00	
		(0.00)	(0.00)	(0.00)	(0.64)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
(15)	Accounting standards	**0.05**	**0.02**	**0.11**	**-0.22**	**0.07**	**-0.09**	**0.05**	**-0.05**	**-0.04**	**0.02**	**-0.08**	-0.01	**0.12**	**0.16**	1.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	

Table 2.3. DID Probit: Foreign Institutional Ownership and Corporate Tax Planning

Difference-in-differences regressions around the elimination of portfolio restrictions to Norwegian pension funds in 2008. Pre-treatment means (Panel A) and results are for overall foreign equity investments by Norwegian insurances and pension funds (Panel B) and new equity investments only (Panel C). Treated is an indicator variable that equals one if a foreign stock is held by a Norwegian pension fund; and zero otherwise. Post is an indicator variable that equals one in the years after 2008; and zero otherwise. The analysis is led on a two-year event window surrounding 2008. The control group includes foreign investee firms of Norwegian institutional investors other than pension funds. Treatment firms are matched to the nearest neighbour control firms with replacement using propensity scores with multiple lagged (two-year) variables. The Appendix contains variable definitions. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Pre-Treatment Means

	Treated firms	Control firms	Difference	T-test
Total Equity Investments by Norwegian Insurances and Pension Fund				
Foreign IO	0.0747	0.1066	**0.0319*** **	4.9503
Domestic IO	0.3328	0.3261	-0.0067	-0.3376
Closely-held-shares	0.3584	0.2934	**-0.0650*** **	-4.9579
Firms size	21.9816	22.4554	**0.4739*** **	4.1268
Pretax income	0.0749	0.0919	**0.0170*** **	2.3927
Leverage	0.2119	0.2081	-0.0038	-0.3743
Market-to-book	1.7405	1.6577	-0.0828	-0.8837
PP&E	0.2926	0.2744	-0.01823	-1.5016
R&D expense	0.0220	0.0188	-0.0031	-1.0994
Equity income	0.0010	0.0014	**0.0004***	1.6462
Intangibles	0.1418	0.1586	**0.0169***	1.6894
Foreign sales	0.2470	0.3376	**0.0907*** **	5.4005
Accounting standards	0.2059	0.31.98	**0.1139*** **	4.9944
New Equity Investments by Norwegian Insurances and Pension Fund				
Foreign IO	0.0805	0.0934	**0.0129** **	1.9683
Domestic IO	0.2645	0.2965	0.0320	1.6190
Closely-held-shares	0.3825	0.3217	**-0.0608*** **	-4.4416
Firms size	22.3219	22.4463	0.1243	0.9730
Pretax income	0.0762	0.0869	0.0107	1.4013
Leverage	0.2150	0.2084	-0.0066	-0.6043
Market-to-book	1.7932	1.6384	-0.1548	-1.5356
PP&E	0.3058	0.2656	**-0.0403*** **	-3.1603
R&D expense	0.0188	0.0196	0.0008	0.2822
Equity income	0.0011	0.0012	0.0000	0.3337
Intangibles	0.1292	0.1351	0.0058	0.5805
Foreign sales	0.2397	0.2889	**0.0492*** **	2.8323
Accounting standards	0.2259	0.3079	**0.0820*** **	3.2934

Panel B. Total Equity Investments by Norwegian Insurances and Pension Funds

VARIABLES	(1) Probit: Peer ETR Diff	(2) Probit: Low ETR Diff	(3) Probit: High ETR Diff	(4) Probit: Peer Cash ETR Diff	(5) Probit: Low Cash ETR Diff	(6) Probit: High Cash ETR Diff
Treated × Post	**0.2043*** **	-0.0288	**-0.1601** **	**0.1628** **	0.0605	**-0.1290***
	(0.0687)	(0.0838)	(0.0644)	(0.0709)	(0.0827)	(0.0692)
Post	-0.1303*	0.1239	0.0547	-0.0769	-0.0209	0.0489
	(0.0700)	(0.0848)	(0.0653)	(0.0702)	(0.0854)	(0.0700)
Treated	-0.0890	-0.0286	0.1364**	-0.1170*	-0.0684	0.1052*
	(0.0608)	(0.0818)	(0.0669)	(0.0629)	(0.0759)	(0.0628)
Domestic IO	-0.4672***	-0.4990***	0.6027***	-0.3032***	-0.1431	0.3100***
	(0.0758)	(0.0864)	(0.0756)	(0.0734)	(0.0926)	(0.0713)
Closely-held-shares	-0.0936	0.0108	0.0054	-0.1717**	0.1102	0.1034
	(0.0828)	(0.1018)	(0.0892)	(0.0842)	(0.1042)	(0.0859)
Firm size	0.0585***	-0.0795***	-0.0050	0.0090	-0.0196	0.0295***
	(0.0103)	(0.0130)	(0.0121)	(0.0105)	(0.0136)	(0.0108)
Pretax income	0.5674***	-1.4503***	1.1849***	1.4556***	-2.5262***	1.3295***
	(0.1969)	(0.2418)	(0.1719)	(0.3436)	(0.4004)	(0.1739)
Leverage	-0.3013***	0.8054***	-0.0393	-0.0178	0.3232**	-0.3445***
	(0.0985)	(0.1208)	(0.1067)	(0.1016)	(0.1291)	(0.1082)
Market-to-book	-0.0602***	-0.0451*	-0.0466***	-0.0123	-0.0963***	-0.0992***
	(0.0148)	(0.0257)	(0.0168)	(0.0210)	(0.0360)	(0.0186)
PP&E	-0.0675	-0.1351	0.2895***	0.0045	-0.0568	-0.2305**
	(0.0988)	(0.1175)	(0.1078)	(0.0994)	(0.1192)	(0.1026)
R&D expense	-0.3112	0.4741	0.1701	0.0327	-2.0929**	-0.8148*
	(0.4499)	(0.6283)	(0.4185)	(0.5279)	(0.8145)	(0.4809)
Equity income	2.6183	-2.2423	9.5741**	4.6074	-3.6106	5.5905
	(3.6044)	(5.3458)	(4.4047)	(3.8083)	(5.2463)	(4.0362)
Intangibles	-0.1779	-0.1313	0.4569***	-0.2090*	-0.5617***	0.3547***
	(0.1207)	(0.1374)	(0.1227)	(0.1163)	(0.1382)	(0.1157)
Foreign sales	0.1376**	0.0548	-0.1284**	0.1477**	-0.1327*	-0.0739
	(0.0584)	(0.0742)	(0.0639)	(0.0575)	(0.0759)	(0.0597)
Acc. standards	0.1662***	-0.3328***	-0.0613	-0.0539	0.0861	0.0381
	(0.0508)	(0.0638)	(0.0580)	(0.0537)	(0.0660)	(0.0557)
Observations	10,207	10,207	10,207	9,392	9,392	9,392
Pseudo R^2	0.04	0.09	0.04	0.02	0.10	0.02
Year FE	YES	YES	YES	YES	YES	YES
Marginal effect: Treated × Post	**0.057*** **	-0.005	**-0.050** **	**0.047** **	0.013	**-0.038***

Panel C. New Equity Investments by Norwegian Insurances and Pension Funds

VARIABLES	(1) Probit: Peer ETR Diff	(2) Probit: Low ETR Diff	(3) Probit: High ETR Diff	(4) Probit: Peer Cash ETR Diff	(5) Probit: Low Cash ETR Diff	(6) Probit: High Cash ETR Diff
Treated × Post	**0.1991*** **	0.0361	**-0.3212*** **	**0.1984*** **	0.1290	**-0.2229*** **
	(0.0756)	(0.0867)	(0.0672)	(0.0754)	(0.0830)	(0.0722)
Post	-0.0777	0.0735	0.1369**	-0.0603	-0.0782	0.0758
	(0.0750)	(0.0850)	(0.0681)	(0.0749)	(0.0863)	(0.0728)
Treated	0.0045	-0.0066	0.1172	-0.0296	-0.0973	0.0501
	(0.0655)	(0.0836)	(0.0713)	(0.0662)	(0.0786)	(0.0678)
Domestic IO	-0.5274***	-0.4368***	0.5165***	-0.3167***	-0.2261*	0.2907***
	(0.1001)	(0.1067)	(0.0988)	(0.0957)	(0.1173)	(0.0911)
Closely-held-shares	-0.1228	0.0038	0.0068	-0.1830*	0.0852	0.1758*
	(0.1055)	(0.1240)	(0.1145)	(0.1050)	(0.1259)	(0.1065)
Firm size	0.0548***	-0.0923***	-0.0003	0.0223*	-0.0233	0.0274**
	(0.0121)	(0.0150)	(0.0141)	(0.0118)	(0.0155)	(0.0129)
Pretax income	0.7110***	-1.8879***	0.9506***	1.9305***	-3.1334***	0.7968***
	(0.2758)	(0.3171)	(0.2011)	(0.2895)	(0.4039)	(0.2096)
Leverage	-0.3705***	1.0538***	-0.0335	0.0727	0.3346**	-0.2411*
	(0.1236)	(0.1499)	(0.1392)	(0.1241)	(0.1529)	(0.1370)
Market-to-book	-0.0631***	-0.0232	-0.0614***	-0.0222	-0.0455	-0.0689***
	(0.0185)	(0.0300)	(0.0198)	(0.0224)	(0.0345)	(0.0214)
PP&E	-0.2118*	-0.0669	0.3350**	-0.0054	-0.1204	-0.2757**
	(0.1137)	(0.1388)	(0.1316)	(0.1203)	(0.1477)	(0.1277)
R&D expense	-1.2883*	-0.0375	0.6480	-0.3615	-2.3293**	-0.6001
	(0.7392)	(0.8355)	(0.5795)	(0.8007)	(0.9338)	(0.6377)
Equity income	2.6228	1.0970	4.2365	8.4423*	-3.5521	-3.4412
	(4.0538)	(6.4315)	(5.6532)	(4.7563)	(6.6378)	(4.8088)
Intangibles	-0.1584	-0.3918**	0.5862***	-0.1574	-0.7121***	0.2523*
	(0.1502)	(0.1720)	(0.1629)	(0.1475)	(0.1741)	(0.1423)
Foreign sales	0.1522**	0.1138	-0.1037	0.1864**	-0.0326	-0.1079
	(0.0712)	(0.0937)	(0.0844)	(0.0747)	(0.0907)	(0.0764)
Acc. standards	0.1616***	-0.2414***	-0.1093	-0.0671	0.1484**	0.0402
	(0.0585)	(0.0743)	(0.0701)	(0.0653)	(0.0756)	(0.0641)
Observations	6,719	6,719	6,719	6,210	6,210	6,210
Pseudo R^2	0.05	0.11	0.04	0.03	0.11	0.02
Year FE	YES	YES	YES	YES	YES	YES
Marginal effect: Treated × Post	**0.057*** **	0.007	**-0.098*** **	**0.057*** **	0.026	**-0.067*** **

Table 2.4. DID Probit: The Role of Political Costs on Tax Planning

Difference-in-differences regressions using quartile sub-samples based on size (Net revenues). Descriptive statistics (Panels A) and results for overall foreign equity investments by Norwegian insurances and pension funds (Panel B) and new equity investments only (Panel C). Treated is an indicator variable that equals one if a foreign stock is held by a Norwegian pension fund; and zero otherwise. Post is an indicator variable that equals one in the years after 2008; and zero otherwise. The analysis is led on a two-year event window surrounding 2008. All regressions include control variables, with the exception of Firm size, and year fixed effects. The Appendix contains variable definitions. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Descriptive Statistics by Net Revenues

Net revenues	N	Mean	Median	SD	Min	Max
Total Equity Investments						
Large	8,525	21.095	20.941	1.157	19.301	26.768
Small	1,592	18.264	18.654	1.243	10.158	19.300
New Equity Investments						
Large	5,579	21.189	21.025	1.214	19.301	25.546
Small	1,074	18.252	18.643	1.247	11.427	19.300

Panel B. Total Equity Investments: Results

VARIABLES	(1) Probit: Peer ETR Diff	(2) Probit: Low ETR Diff	(3) Probit: High ETR Diff	(4) Probit: Peer Cash ETR Diff	(5) Probit: Low Cash ETR Diff	(6) Probit: High Cash ETR Diff
Large firms subsample						
Post × Treated	**0.2480*** **	-0.0525	**-0.1306***	**0.1707** **	0.0615	-0.0999
	(0.0714)	(0.0979)	(0.0687)	(0.0755)	(0.0936)	(0.0718)
Post	-0.1664**	0.1216	0.0032	-0.0179	-0.0716	-0.0004
	(0.0725)	(0.0975)	(0.0691)	(0.0745)	(0.0943)	(0.0723)
Treated	-0.1497**	0.0290	0.1171*	-0.1268*	-0.0479	0.0803
	(0.0656)	(0.0974)	(0.0703)	(0.0660)	(0.0836)	(0.0653)
Observations	8,522	8,522	8,522	8,089	8,089	8,089
Pseudo R^2	0.04	0.13	0.03	0.03	0.15	0.02
Other controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Small firms subsample						
Post × Treated	-0.0861	0.3165	**-0.5581** **	0.1622	0.2578	**-0.6537** **
	(0.2607)	(0.2010)	(0.2204)	(0.2617)	(0.2517)	(0.3003)
Post	0.0329	-0.0816	0.6109***	-0.4300	-0.0258	0.6580**
	(0.2706)	(0.2035)	(0.2230)	(0.2696)	(0.2716)	(0.3129)
Treated	0.1412	-0.2624	0.3870*	-0.0391	-0.3381	0.3964*
	(0.1785)	(0.1867)	(0.2164)	(0.1981)	(0.2117)	(0.2398)
Observations	1,591	1,591	1,591	1,247	1,247	1,247
Pseudo R^2	0.07	0.05	0.13	0.05	0.08	0.06
Other controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Panel C. New Equity Investments: Results

VARIABLES	(1) Probit: Peer ETR Diff	(2) Probit: Low ETR Diff	(3) Probit: High ETR Diff	(4) Probit: Peer Cash ETR Diff	(5) Probit: Low Cash ETR Diff	(6) Probit: High Cash ETR Diff
Large firms subsample						
Post × Treated	**0.2161*** **	0.0276	**-0.2976*** **	**0.2072** **	0.0916	**-0.2242*** **
	(0.0819)	(0.0990)	(0.0743)	(0.0825)	(0.0940)	(0.0771)
Post	-0.0706	0.0275	0.0980	-0.0109	-0.1109	0.0647
	(0.0811)	(0.0962)	(0.0751)	(0.0820)	(0.0943)	(0.0777)
Treated	-0.0183	-0.0106	0.1003	-0.0193	-0.0983	0.0553
	(0.0720)	(0.0936)	(0.0779)	(0.0715)	(0.0863)	(0.0720)
Observations	5,578	5,578	5,578	5,310	5,310	5,310
Pseudo R^2	0.04	0.14	0.03	0.03	0.14	0.01
Other controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Small firms subsample						
Post × Treated	0.0636	0.0270	**-0.3769***	0.1657	0.2721	-0.2639
	(0.2174)	(0.2008)	(0.1970)	(0.2063)	(0.2208)	(0.2422)
Post	-0.1751	0.3017	0.3132	-0.2309	0.0241	0.0456
	(0.2138)	(0.1915)	(0.1964)	(0.1983)	(0.2448)	(0.2484)
Treated	0.0323	0.1615	0.1698	-0.2151	-0.0102	0.0289
	(0.1577)	(0.1899)	(0.1654)	(0.1733)	(0.2253)	(0.2008)
Observations	1,073	1,073	1,073	858	858	858
Pseudo R	0.09	0.08	0.11	0.08	0.13	0.06
Other controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Table 2.5. IV Probit: Foreign Institutional Ownership and Corporate Tax Planning

Probit and IV Probit regressions using longitudinal data on an international sample of non-financial and non-utility firms over the period 2000-2016. In the IV Probit regressions, MSCI membership is used as instrument for Foreign IO. Whole sample in Panel A. In Panel B sub-samples are defined dividing LnMV into quartiles and all regressions include all control variables and year fixed effects. The Appendix provides variable definitions. All the explanatory variables are lagged by one year. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at firm level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance levels at 1%, 5% and 10%, respectively.

Panel A: Earnings-based ETR

VARIABLES	(1) Probit: Peer ETR Diff	(2) Probit: Peer ETR Diff	(3) First-stage: Foreign IO	(4) Second-stage: Peer ETR Diff	(5) Second-stage: Low ETR Diff	(6) Second-stage: High ETR Diff
IO	**-0.2786*** **					
	(0.0252)					
Foreign IO		**0.2147*** **		**1.1022*** **	**-3.0233*** **	**-1.4151*** **
		(0.0591)		(0.3864)	(0.4653)	(0.4377)
Domestic IO		**-0.3322*** **	**-0.0637*** **	**-0.2776*** **	**-0.6241*** **	**0.4999*** **
		(0.0267)	(0.0038)	(0.0371)	(0.0398)	(0.0422)
Closely-held-shares	0.0779***	0.0937***	-0.0938***	0.1848***	-0.4079***	-0.0949*
	(0.0250)	(0.0250)	(0.0039)	(0.0457)	(0.0548)	(0.0525)
Firm size	0.0677***	0.0629***	0.0055***	0.0551***	-0.0635***	0.0074*
	(0.0023)	(0.0024)	(0.0002)	(0.0039)	(0.0054)	(0.0043)
Pretax income	0.8048***	0.8073***	0.0196***	0.7865***	-0.4678***	0.9801***
	(0.0558)	(0.0557)	(0.0018)	(0.0564)	(0.0277)	(0.0454)
Leverage	-0.2214***	-0.2167***	-0.0008	-0.2180***	0.4778***	0.0103
	(0.0318)	(0.0317)	(0.0026)	(0.0317)	(0.0340)	(0.0339)
Market-to-book	-0.0121***	-0.0130***	0.0022***	-0.0152***	-0.0148***	-0.0349***
	(0.0041)	(0.0041)	(0.0003)	(0.0041)	(0.0042)	(0.0047)
PP&E	-0.0404	-0.0474	0.0138***	-0.0628**	0.0698*	0.1174***
	(0.0297)	(0.0296)	(0.0032)	(0.0302)	(0.0360)	(0.0355)
R&D expense	-0.4587***	-0.4355***	0.0098	-0.4464***	-0.0332	-0.8142***
	(0.1303)	(0.1299)	(0.0070)	(0.1297)	(0.1060)	(0.1227)
Equity income	-1.1529	-1.1358	-0.2757***	-1.1275	-3.2592**	8.0683***
	(1.2980)	(1.2949)	(0.0878)	(1.2918)	(1.5761)	(1.4620)
Intangibles	-0.2093***	-0.2105***	0.0419***	-0.2560***	0.2938***	0.3528***
	(0.0375)	(0.0374)	(0.0048)	(0.0415)	(0.0453)	(0.0458)
Foreign sales	0.1306***	0.1018***	0.0476***	0.0546**	0.1647***	0.0585**
	(0.0174)	(0.0177)	(0.0027)	(0.0265)	(0.0312)	(0.0294)
Accounting standards	0.1279***	0.1066***	0.0134***	0.0916***	-0.1644***	0.0283*
	(0.0140)	(0.0141)	(0.0019)	(0.0156)	(0.0199)	(0.0170)
MSCI membership			**0.0543*** **			
			(0.0026)			
Observations	130,648	130,648	130,648	130,648	130,648	130,648
Year FE	YES	YES	YES	YES	YES	YES
Adjusted/ Pseudo R^2	0.06	0.06	0.20	0.06	0.07	0.05
Marginal effect: Foreign IO		**0.0566*** **		**0.2908*** **	**-0.8198*** **	**-0.3813*** **

Panel B: Cash-based ETR

VARIABLES	(1) Probit: Peer Cash ETR Diff	(2) Probit: Peer Cash ETR Diff	(3) First-stage: Foreign IO	(4) Second-stage: Peer Cash ETR Diff	(5) Second-stage: Low Cash ETR Diff	(6) Second-stage: High Cash ETR Diff
IO	-0.0277					
	(0.0228)					
Foreign IO		**0.3874*** **		**1.5945*** **	**-4.1458*** **	**-1.5174*** **
		(0.0620)		(0.3716)	(0.4202)	(0.4017)
Domestic IO		**-0.0655*** **	**-0.0715*** **	0.0186	**-0.6690*** **	**0.0922** **
		(0.0235)	(0.0044)	(0.0359)	(0.0417)	(0.0397)
Closely-held-shares	0.0605**	0.0746***	-0.1023***	0.2099***	-0.3972***	-0.1273**
	(0.0256)	(0.0256)	(0.0045)	(0.0478)	(0.0564)	(0.0527)
Firm size	0.0271***	0.0229***	0.0053***	0.0125***	-0.0117**	0.0366***
	(0.0023)	(0.0024)	(0.0003)	(0.0038)	(0.0048)	(0.0039)
Pretax income	0.3568***	0.3594***	0.0238***	0.3284***	-0.5775***	1.3078***
	(0.0369)	(0.0368)	(0.0024)	(0.0380)	(0.0374)	(0.0716)
Leverage	-0.1299***	-0.1275***	0.0010	-0.1307***	0.5399***	-0.1905***
	(0.0312)	(0.0312)	(0.0033)	(0.0312)	(0.0379)	(0.0360)
Market-to-book	0.0161***	0.0153***	0.0031***	0.0112***	-0.0408***	-0.0535***
	(0.0037)	(0.0037)	(0.0004)	(0.0039)	(0.0055)	(0.0055)
PP&E	0.1679***	0.1626***	0.0129***	0.1412***	-0.1059***	-0.1838***
	(0.0298)	(0.0297)	(0.0037)	(0.0306)	(0.0387)	(0.0348)
R&D expense	-0.0562	-0.0345	-0.0019	-0.0375	-0.7906***	-1.3307***
	(0.1204)	(0.1202)	(0.0099)	(0.1202)	(0.1369)	(0.1568)
Equity income	3.8459***	3.8419***	-0.2379**	3.7932***	-7.2151***	4.7235***
	(1.2887)	(1.2827)	(0.0945)	(1.2719)	(1.5062)	(1.4810)
Intangibles	-0.1220***	-0.1244***	0.0521***	-0.1986***	0.0086	0.2252***
	(0.0366)	(0.0366)	(0.0056)	(0.0430)	(0.0546)	(0.0471)
Foreign sales	0.1593***	0.1341***	0.0495***	0.0674**	0.1507***	0.0201
	(0.0175)	(0.0178)	(0.0029)	(0.0271)	(0.0327)	(0.0290)
Accounting standards	0.0471***	0.0296**	0.0125***	0.0105	0.1039***	0.0121
	(0.0143)	(0.0144)	(0.0021)	(0.0156)	(0.0186)	(0.0168)
MSCI membership			**0.0531*** **			
			(0.0028)			
Observations	108,483	108,483	108,483	108,483	108,483	108,483
Year FE	YES	YES	YES	YES	YES	YES
Adjusted/Pseudo R^2	0.01	0.01	0.21	0.01	0.05	0.03
Marginal effect: Foreign IO		**0.1080*** **		**0.4366*** **	**-1.1394*** **	**-0.3981*** **

Table 2.6. IV Probit: The Role of Political Costs on Tax Planning

IV Probit regressions dividing Net revenues into quartile sub-samples. In Panel A (Panel B) the dependent variable is Peer ETR Diff (Peer Cash ETR Diff). MSCI membership is used as instrument for foreign institutional ownership. All regressions include control variables, with the exception of Firm size, and year fixed effects. The Appendix provides variable definitions. All the explanatory variables are lagged by one year. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at industry-year level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance levels at 1%, 5% and 10%, respectively.

Panel A: Earnings-based ETR

VARIABLES	(1) First-stage: Foreign IO	(2) Second-stage: Peer ETR Diff	(3) Second-stage: Low ETR Diff	(4) Second-stage: High ETR Diff
Largest firms sub-sample				
Foreign IO		**4.0649*** **	**-7.1346*** **	-1.6128
		(0.8374)	(0.4155)	(1.0168)
Domestic IO	-0.1824***	0.2826	**-1.4173*** **	0.0079
	(0.0080)	(0.1959)	(0.0976)	(0.2074)
MSCI membership	**0.0198*** **			
	(0.0022)			
Observations	27,931	27,931	27,931	27,931
Adjusted/Pseudo R^2	0.29	0.03	0.10	0.02
Second largest firms sub-sample				
Foreign IO		**1.2214***	-1.4893	**-2.6453*** **
		(0.6741)	(0.9225)	(0.7268)
Domestic IO	-0.1089***	**-0.5246*** **	**-0.3022*** **	**0.3779*** **
	(0.0048)	(0.0961)	(0.1147)	(0.1089)
MSCI membership	**0.0600*** **			
	(0.0045)			
Observations	26,796	26,796	26,796	26,796
Adjusted/Pseudo R^2	0.20	0.05	0.08	0.04
Second smallest firms sub-sample				
Foreign IO		1.8956	-0.1107	**-4.7241*** **
		(1.2403)	(1.4518)	(1.2843)
Domestic IO	-0.0626***	**-0.4731*** **	-0.1089	**0.4729*** **
	(0.0034)	(0.1071)	(0.1074)	(0.1134)
MSCI membership	**0.0726*** **			
	(0.0085)			
Observations	25,129	25,129	25,129	25,129
Adjusted/Pseudo R^2	0.12	0.05	0.07	0.04
Smallest firms sub-sample				
Foreign IO		-2.8483	**7.5558*** **	**-5.5610***
		(2.7213)	(1.8279)	(2.9649)
Domestic IO	-0.0171***	**-0.2717*** **	**-0.3239*** **	**0.4869*** **
	(0.0035)	(0.0825)	(0.1066)	(0.1041)
MSCI membership	**0.0871*** **			
	(0.0167)			
Observations	23,254	23,254	23,254	23,254
Adjusted/Pseudo R^2	0.05	0.06	0.04	0.07

Panel B: Cash-based ETR

VARIABLES	(1) First-stage: Foreign IO	(2) Second-stage: Peer ETR Diff	(3) Second-stage: Low ETR Diff	(4) Second-stage: High ETR Diff
Largest firms sub-sample				
Foreign IO		**4.7708*** **	**-7.2232*** **	-1.4826
		(0.7466)	(0.4115)	(1.0350)
Domestic IO	-0.1847***	**0.7750*** **	**-1.4372*** **	-0.2194
	(0.0083)	(0.1718)	(0.1028)	(0.2000)
MSCI membership	**0.0183*** **			
	(0.0023)			
Observations	25,956	25,956	25,956	25,956
Adjusted/Pseudo R^2	0.29	0.01	0.10	0.01
Second largest firms sub-sample				
Foreign IO		**2.6818*** **	0.1278	**-3.0921*** **
		(0.7092)	(0.9294)	(0.7540)
Domestic IO	-0.1083***	0.1426	-0.1177	**-0.1804***
	(0.0050)	(0.0942)	(0.1167)	(0.0988)
MSCI membership	**0.0612*** **			
	(0.0049)			
Observations	24,501	24,501	24,501	24,501
Adjusted/Pseudo R^2	0.21	0.01	0.07	0.02
Second smallest firms sub-sample				
Foreign IO		1.0040	**3.0252** **	**-4.4831*** **
		(1.4499)	(1.3754)	(1.5055)
Domestic IO	-0.0612***	-0.1662	-0.0971	-0.1312
	(0.0035)	(0.1144)	(0.1274)	(0.1140)
MSCI membership	**0.0676*** **			
	(0.0087)			
Observations	22,073	22,073	22,073	22,073
Adjusted/Pseudo R^2	0.12	0.02	0.06	0.03
Smallest firms sub-sample				
Foreign IO		-4.1312	**10.1135*** **	**-6.6805** **
		(3.6839)	(2.7893)	(3.3437)
Domestic IO	-0.0254***	**-0.4283*** **	**-0.3445** **	0.0512
	(0.0031)	(0.1189)	(0.1627)	(0.1260)
MSCI membership	**0.0757*** **			
	(0.0184)			
Observations	15,749	15,749	15,749	15,749
Adjusted/Pseudo R^2	0.05	0.02	0.04	0.07

Table 2.7. Foreign Institutional Ownership, Corporate Governance and Tax Planning

Probit regressions using longitudinal data on international non-financial and non-utility firms across the years 2000-2016. The Appendix provides variable definitions. All the explanatory variables are lagged by one year. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at industry-year level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance at 1%, 5% and 10% levels, respectively.

VARIABLES	(1) Second-stage: Peer ETR Diff	(2) Second-stage: Peer Cash ETR Diff	(3) Second-stage: Peer ETR Diff	(4) Second-stage: Peer Cash ETR Diff
Foreign IO	**1.1426*** **	**0.4528** **	**1.4856*** **	**0.9118** **
	(0.2116)	(0.2238)	(0.3827)	(0.4016)
CEO power	-0.0766***	-0.0370		
	(0.0256)	(0.0247)		
Foreign IO × CEO power	**1.0733*** **	**0.7483** **		
	(0.3269)	(0.3007)		
Low incentive comp.			-0.0775***	-0.0866***
			(0.0296)	(0.0336)
Foreign IO × Low incentive comp.			**0.4202***	**0.5455** **
			(0.2193)	(0.2595)
Domestic IO	-0.1991***	-0.0549	0.0689	0.3430***
	(0.0301)	(0.0361)	(0.1043)	(0.1148)
Firm size	0.0626***	0.0472***	0.0099	-0.0021
	(0.0047)	(0.0050)	(0.0116)	(0.0132)
Pretax income	0.6964***	0.1764**	0.5956***	0.0988
	(0.0929)	(0.0890)	(0.1286)	(0.0777)
Leverage	-0.0631*	-0.0470	0.0938	-0.0492
	(0.0377)	(0.0435)	(0.0697)	(0.0710)
Market-to-book	-0.0420***	0.0105*	-0.0273***	0.0107
	(0.0057)	(0.0058)	(0.0098)	(0.0086)
PP&E	-0.2022***	0.0653	-0.2064**	-0.0146
	(0.0499)	(0.0720)	(0.0903)	(0.0823)
R&D expense	-0.1892	0.2231	0.6864***	0.8581***
	(0.1593)	(0.1949)	(0.2645)	(0.2187)
Equity income	-2.9934**	-2.9615*	-2.7913	-4.0749
	(1.4657)	(1.5735)	(2.7489)	(3.0418)
Intangibles	-0.2342***	-0.1241***	-0.3264***	-0.1875***
	(0.0456)	(0.0441)	(0.0755)	(0.0687)
Accounting standards	0.2228***	0.0996***	0.2291***	0.1927***
	(0.0235)	(0.0235)	(0.0481)	(0.0461)
Observations	63,336	52,093	19,984	16,876
Pseudo R^2	0.05	0.02	0.03	0.01
Year FE	YES	YES	YES	YES

Table 2.8. Foreign Institutional Ownership and Tax Planning with Bandwidth

IV Probit regressions using longitudinal data on an international sample of non-financial and non-utility firms over the period 2000-2016. The sample is restricted to firms in the 10% bandwidth around the MSCI ACWI cut-off point in each country. The cut-off point is, in each country, the first firm after which the free-float adjusted market capitalization ranking is at least 85% of the total free-float market capitalization. Free-float adjusted market capitalization ranking lower or equal to 85% (Below cut-off) is used as instrument for foreign institutional ownership. The Appendix provides variable definitions. All the explanatory variables are lagged by one year. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at firm level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance levels at 1%, 5% and 10%, respectively.

VARIABLES	(1) First-stage: Foreign IO	(2) Second-stage: Peer ETR Diff	(3) Second-stage: Low ETR Diff	(4) Second-stage: High ETR Diff	(5) First-stage: Foreign IO	(6) Second-stage: Peer Cash ETR Diff	(7) Second-stage: Low Cash ETR Diff	(8) Second-stage: High Cash ETR Diff
Foreign IO		**4.9346*** **	**-4.9738** **	**-6.0073*** **		0.3698	**-7.5066*** **	-1.7121
		(1.9131)	(2.2144)	(1.5215)		(2.5321)	(1.1019)	(2.5046)
Domestic IO	-0.1629***	0.4897	**-1.3750*** **	-0.5914	-0.1620***	-0.1287	**-1.5543*** **	-0.2088
	(0.0156)	(0.3935)	(0.2994)	(0.3776)	(0.0169)	(0.4233)	(0.1637)	(0.4317)
Below cut-off	**0.0208*** **				**0.0196*** **			
	(0.0057)				(0.0057)			
Observations	11,584	11,584	11,584	11,584	10,593	10,593	10,593	10,593
Adjusted/Pseudo R^2	0.24	0.03	0.08	0.04	0.25	0.01	0.08	0.02
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 2.9. The Role of Investor and Firm's Characteristics

IV Probit regressions using longitudinal data on an international sample of non-financial and non-utility firms over the period 2000-2016. In Panel A, investors are classified based on investment horizons into long-term and short-term; in Panel B, I classify investors based on their legal origin and include foreign investors from common law countries and include a subsample of firms from countries with low investor protection; Panel C includes subsamples of firms classified as U.S. and non-U.S. listed. The Appendix contains variable definitions. All the explanatory variables are lagged by one year. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at firm level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance levels at 1%, 5% and 10%, respectively.

Panel A. Investment Horizons of Foreign Institutional Investors

VARIABLES	(1) First-stage: Foreign IO LT	(2) Second-stage: Peer ETR Diff	(3) Second-stage: Low ETR Diff	(4) Second-stage: High ETR Diff	(5) First-stage: Foreign IO	(6) Second-stage: Peer Cash ETR Diff	(7) Second-stage: Low Cash ETR Diff	(8) Second-stage: High Cash ETR Diff
Foreign IO LT		**3.0369*** **	**-8.6708*** **	**-3.8825*** **		**4.2574*** **	**-11.6207*** **	**-4.0149*** **
		(1.0516)	(1.3343)	(1.1968)		(0.9707)	(1.2114)	(1.0500)
Foreign IO ST		0.8191	**-2.1759** **	-0.0926		**2.3293*** **	-1.1556	-1.2772
		(0.6960)	(0.9024)	(0.7825)		(0.7113)	(0.9102)	(0.8437)
Domestic IO	-0.0043	-0.3373***	-0.4891***	0.5777***	-0.0085**	-0.0594**	-0.5026***	0.1664***
	(0.0032)	(0.0270)	(0.0304)	(0.0284)	(0.0037)	(0.0247)	(0.0337)	(0.0269)
MSCI membership	0.0199***				0.0203***			
	(0.0021)				(0.0022)			
Observations	130,648	130,648	130,648	130,648	108,483	108,483	108,483	108,483
Adj/Pseudo R^2	0.10	0.06	0.07	0.05	0.10	0.01	0.05	0.03
Other controls	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Common Law Institutional Ownership in Low Investor Protection Firms

VARIABLES	First-stage: Foreign IO Common	Second-stage: Peer ETR Diff	Second-stage: Low ETR Diff	Second-stage: High ETR Diff	First-stage: Foreign IO	Second-stage: Peer Cash ETR Diff	Second-stage: Low Cash ETR Diff	Second-stage: High Cash ETR Diff
Foreign IO Common		**1.2394****	**-4.2117*****	0.2022		**3.6133*****	**-4.9847*****	**-1.4486****
		(0.6156)	(0.7927)	(0.7019)		(0.6426)	(0.7712)	(0.6959)
MSCI membership	0.0490***				0.0492***			
	(0.0035)				(0.0038)			
Observations	40,467	40,467	40,467	40,467	31,374	31,374	31,374	31,374
Adj/Pseudo R^2	0.20	0.08	0.02	0.05	0.21	0.02	0.07	0.04
Other controls	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel C: Geographical Origin of Investee Firms

VARIABLES	First-stage: Foreign IO	Second-stage: Peer ETR Diff	Second-stage: Low ETR Diff	Second-stage: High ETR Diff	First-stage: Foreign IO	Second-stage: Peer Cash ETR Diff	Second-stage: Low Cash ETR Diff	Second-stage: High Cash ETR Diff
Non-U.S. Sample								
Foreign IO		**0.8831*** **	**-2.3750*** **	-0.3506		**1.5440*** **	**-2.6966*** **	**-0.9767*** **
		(0.2947)	(0.3773)	(0.3396)		(0.2994)	(0.3509)	(0.3256)
MSCI membership	0.0768***				0.0763***			
	(0.0034)				(0.0035)			
Observations	86,851	86,851	86,851	86,851	72,318	72,318	72,318	72,318
Adj/Pseudo R^2	0.17	0.04	0.06	0.01	0.19	0.01	0.05	0.02
Other controls	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
U.S. Sample								
Foreign IO		**6.7082*** **	**-5.3168***	**-9.6721*** **		-1.4702	**-8.7740*** **	**-8.1791*** **
		(2.4150)	(3.0405)	(0.8972)		(3.1753)	(1.3799)	(1.7001)
MSCI membership	0.0146**				0.0123*			
	(0.0058)				(0.0063)			
Observations	43,797	43,797	43,797	43,797	36,165	36,165	36,165	36,165
Adj/Pseudo R^2	0.14	0.06	0.11	0.09	0.13	0.02	0.09	0.04
Other controls	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 2.10. Robustness Tests

IV Probit regressions using longitudinal data on an international sample of non-financial and non-utility firms over the period 2000-2016. Results are presented using a sub-sample of firm/year observations with non-negative pre-tax income (Panel A), three-year rolling means (Panel B) and an alternative definition of peer groups based on industry and size (Panel C). The Appendix contains variable definitions. All the explanatory variables are lagged by one year. All regressions include year fixed effects. Standard errors (in parentheses) are robust to heteroscedasticity and adjusted for clusters at industry-year level. Fama-French 48 industry classification is used to identify industries. ***, ** and * represent statistical significance levels at 1%, 5% and 10%, respectively.

VARIABLES	(1) First stage: Foreign IO	(2) Second-stage: Peer ETR Diff	(3) Second-stage: Low ETR Diff	(4) Second-stage: High ETR Diff	(5) First stage: Foreign IO	(6) Second-stage: Peer Cash ETR Diff	(7) Second-stage: Low Cash ETR Diff	(8) Second-stage: High Cash ETR Diff
Panel A. Non-negative pretax income								
Foreign IO		**0.9172****	**-2.4353*****	**-1.9914*****		**1.0088****	**-3.1457*****	**-1.9184*****
		(0.4358)	(0.6415)	(0.5033)		(0.4114)	(0.5564)	(0.4461)
Domestic IO	-0.0824***	-0.4060***	-0.5910***	0.3400***	-0.0843***	-0.0431	-0.7020***	-0.0131
	(0.0049)	(0.0488)	(0.0655)	(0.0575)	(0.0053)	(0.0436)	(0.0579)	(0.0491)
MSCI membership	0.0508***				0.0501***			
	(0.0027)				(0.0029)			
Observations	93,504	93,504	93,504	93,504	83,647	83,647	83,647	83,647
Adj/Pseudo R^2	0.22	0.04	0.06	0.03	0.23	0.01	0.05	0.01
Marginal effect: Foreign IO		**0.2877*****	**-0.3803*****	**-0.6318*****		**0.3075*****	**-0.5512*****	**-0.6318*****

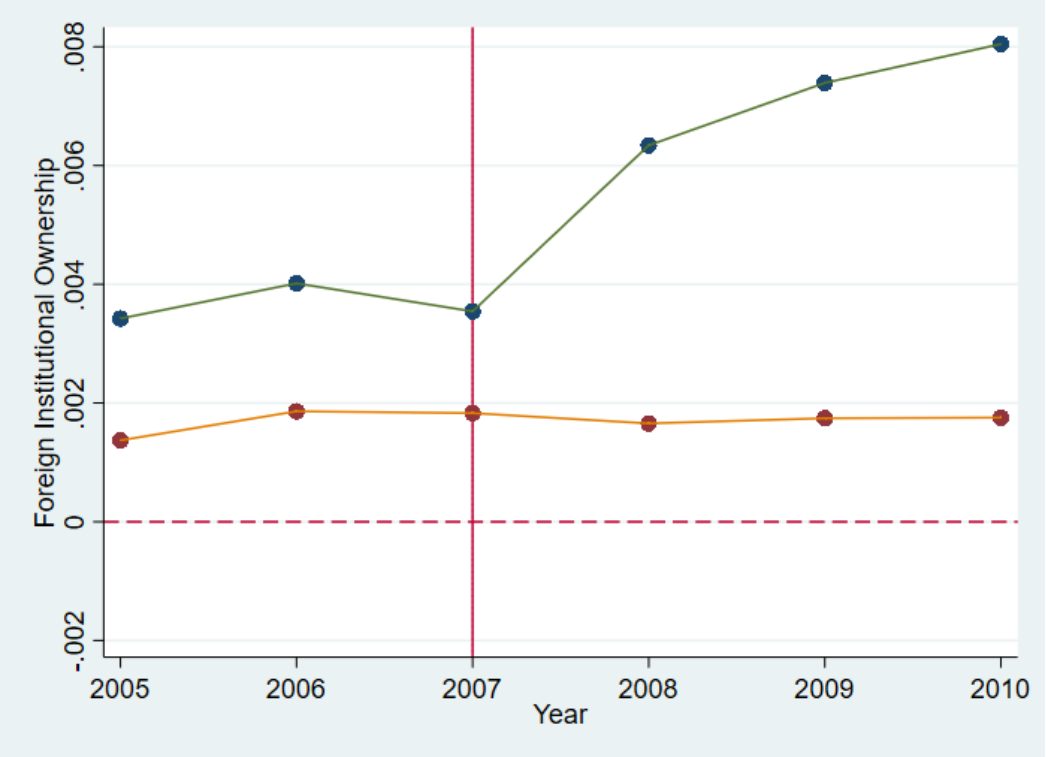
Panel B. Three-year rolling means								
Foreign IO		**1.6188*** **	**-3.1842*** **	**-2.7792*** **		**1.4158** **	**-3.5580*** **	**-2.7191*** **
		(0.5278)	(0.7337)	(0.6261)		(0.5538)	(0.6987)	(0.6532)
Domestic IO	-0.0835***	-0.0135	-0.8091***	0.2418***	-0.0922***	0.1274**	-0.5340***	0.0087
	(0.0052)	(0.0562)	(0.0692)	(0.0720)	(0.0060)	(0.0598)	(0.0754)	(0.0773)
MSCI membership	0.0471***				0.0452***			
	(0.0030)				(0.0032)			
Observations	88,653	88,653	88,653	88,653	73,895	73,895	73,895	73,895
Adj/Pseudo R^2	0.23	0.05	0.13	0.04	0.24	0.04	0.08	0.03
Marginal effect: Foreign IO		**0.4150*** **	**-0.8230*** **	**-0.7460*** **		**0.3486*** **	**-0.8834*** **	**-0.6714*** **
Panel C. Alternative peer measure								
Foreign IO		**7.5513*** **	**-5.8212*** **	**-8.2733*** **		**7.2610*** **	**-5.2108** **	**-9.8046*** **
		(1.5843)	(1.9444)	(1.4940)		(2.3190)	(2.9751)	(1.5058)
Domestic IO	-0.1350***	0.9518***	-1.0142***	-0.8781***	-0.1501***	1.0219**	-0.6775	-1.3819***
	(0.0091)	(0.2622)	(0.2696)	(0.2813)	(0.0107)	(0.4046)	(0.4913)	(0.3206)
MSCI membership	0.0122***				0.0086**			
	(0.0033)				(0.0035)			
Observations	130,648	130,648	130,648	130,648	108,483	108,483	108,483	108,483
Adj/Pseudo R^2	0.32	0.07	0.08	0.10	0.33	0.03	0.08	0.07
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Marginal effect: Foreign IO		**2.5730*** **	**-1.7340*** **	**-2.7840*** **		**1.7220*** **	**-1.0490*** **	**-2.8560*** **

FIGURES

Figure 2.1. Foreign Institutional Ownership around Norway's Elimination of Portfolio Restriction

Panel A (B) shows a graphical representation of annual average (median) foreign equity investment by Norwegian insurances and pension funds (i.e. Treated) in the top (green) line and Norwegian institutional investors other than insurances and pension funds (i.e. Control) in the bottom (orange) line plotted across time. Year represents the calendar end of the year (31/12). The regulatory change in the Norwegian insurance and pension fund industry occurred in January 2008 and it is represented by the vertical line at the end of 2007. Control firms are matched using propensity score matching replacement that best matches each firm in the treatment group. The sample includes Worldscope non-financial and non-utility firms and covers the years 2000-2016.

Panel A. Mean of Treatment and Control Group



Panel B. Median of Treatment and Control Group

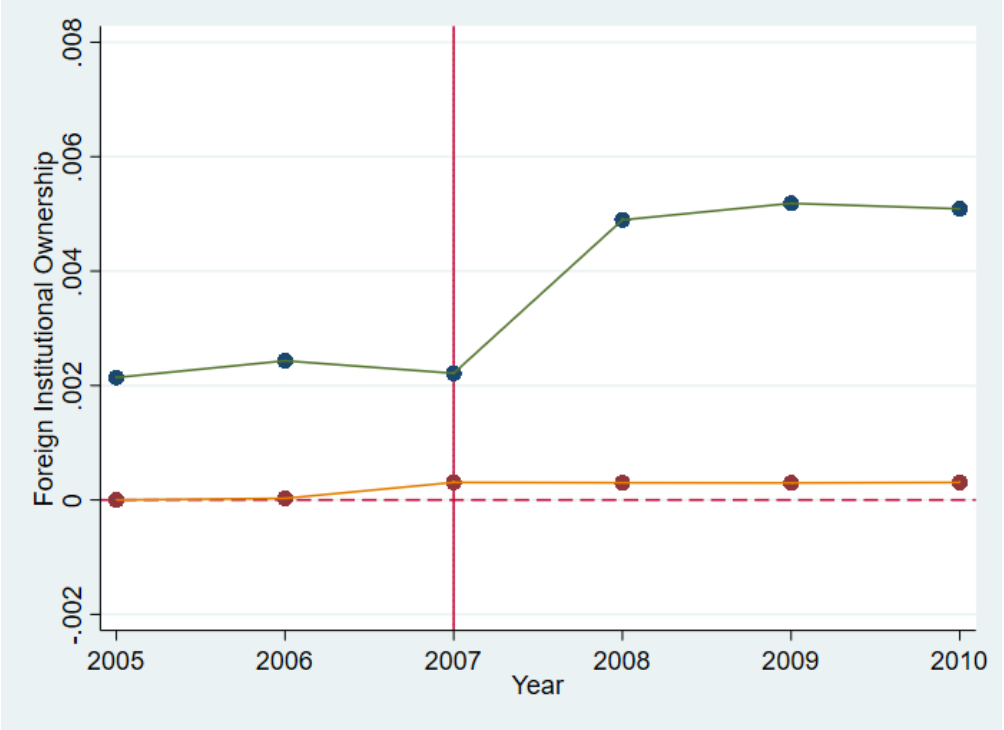
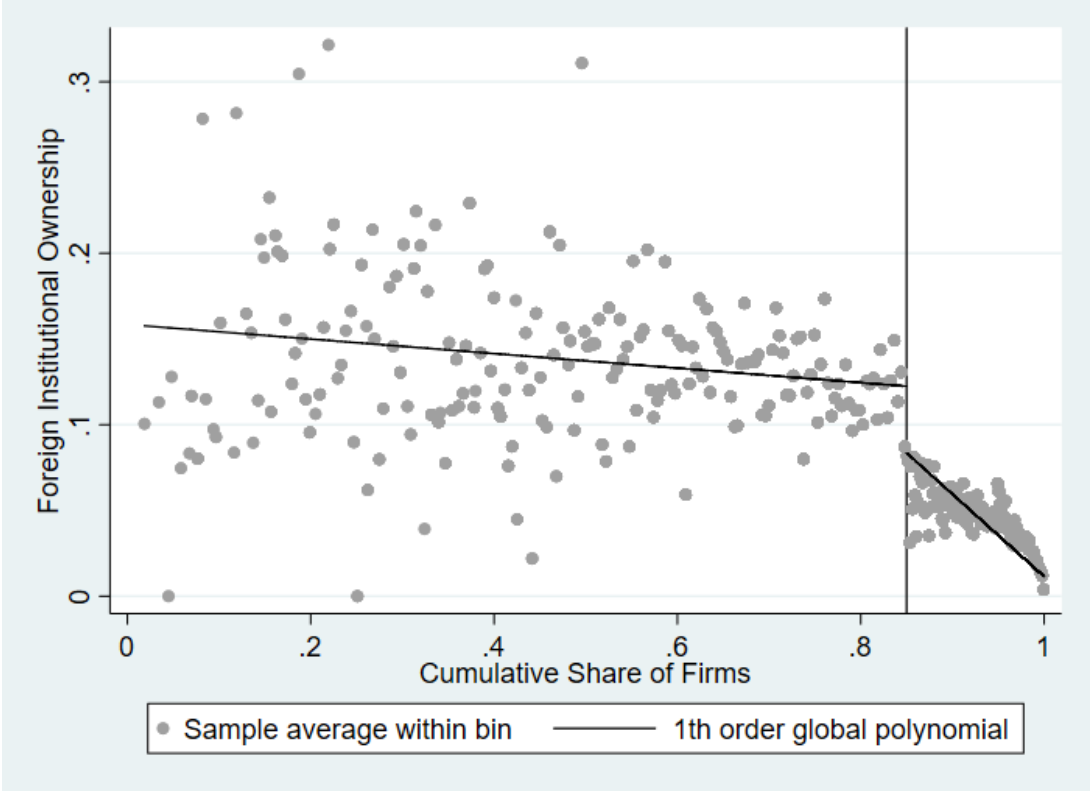


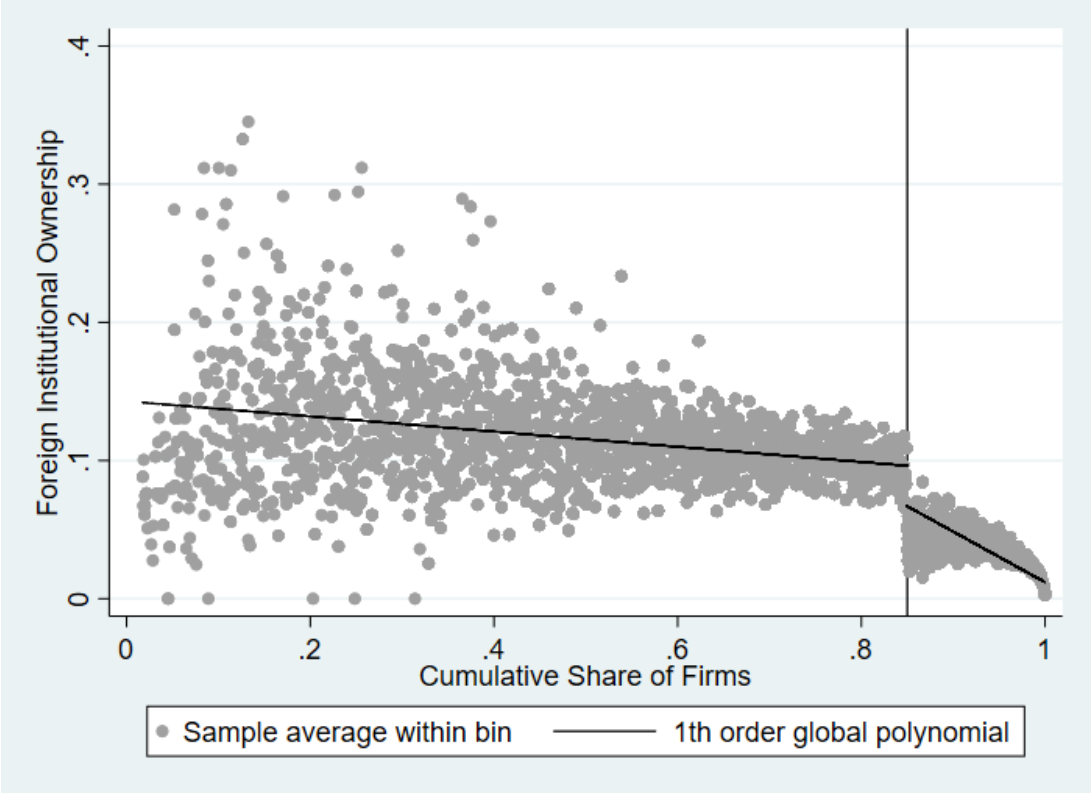
Figure 2.2. Foreign Institutional Ownership around the MSCI ACWI Cut-Off Point

The figures plot foreign institutional ownership against the cumulative share of firms in the 2015 sample (Panel A) and in the whole sample (Panel B). The cut-off point is, for each country, the first firm after which the free-float market capitalization ranking is at least 85% of the total free-float market capitalization. The dots represent the sample means of the two variables in each bin. Bins are selected using the evenly spaced method (Calonico, Cattaneo, and Titiunik 2015). Lines represent first-order polynomials estimated separately above and below the cut-off (i.e. 85% of cumulative shares of firms). The sample includes Worldscope non-financial and non-utility firms and covers the years 2000-2016.

Panel A. Restricted Sample



Panel B. Whole Sample



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Chapter 3

Indexed institutional ownership and geographic segment disclosure

3.1 Introduction and motivation

The growing importance of indexed investors, whose investment strategy is essentially based on an index-tracking activity, has raised questions about their impact on the effectiveness of the "traditional" corporate governance mechanisms (McCahery, Sautner, and Starks 2016; Appel, Gormley, and Keim 2016; Schmidt and Fahlenbrach 2017) and on their role on informational transparency of publicly listed firms (Boone and White 2015; Bird and Karolyi 2016; Schoenfeld 2017).[14] Chapter 3 adds to this literature by focusing on the effect of indexed ownership on geographic disclosure policies, in particular, with respect to country-level disclosure.

The importance of this research area stems from the economically significant, and often opaque, offshore activities led by U.S. multinationals (Reuters 2015) and the managerial incentives for decreased transparency around such activities related to political and reputational costs (Akamah, Hope, and Thomas 2017; Dyreng, Hoopes, Langetieg, and Wilde 2018). For example, a report released by Oxfam documents that U.S. multinationals are keeping $1.4tn in overseas tax havens (Davies 2016).[15] Given the concerns that large indexed investors, due to their passive management strategies and large investment portfolios, might undermine the efficacy of corporate governance (Murphy 2016), this is a particularly interesting setting to examine the monitoring activities of indexed investors with respect to informational transparency in their investee firms.

ASC 280 (previously SFAS 131) provides the legal framework of geographic segment disclosure. Firms are required to present their operations disaggregated by

[14] Indexed institutions are professional investors who seek to mimic the performance of equity or bond indexes. Unlike active stock-pickers, the trading strategy of indexed funds follows index reconstitutions. For this reason, indexed investors are also called "passive investors".
[15] This figure represents approximately 7% of U.S. GDP in 2016. Tax motives are likely to be important determinants of corporate (non-) disclosure behaviour (Akamah et al. 2017).

one or more operating segments (such as industry, geographic area, legal entity or type of costumer) in accordance with their organizational architecture and to provide financial information for each "material" country in which they earn revenues and hold assets. Operations for all "immaterial" countries can be aggregated at higher levels (regions, continents or in one "Total Foreign" residual entry). Yet, the vague definition of materiality in ASC 280 allows corporate managers to have some discretion on the countries that are classified as "immaterial" and can, thereby, be aggregated and those that are in fact "material". I conjecture that this discretion can also have potential implications for firm transparency, warranting an increased demand for monitoring managers' disclosure motives.

As a result, there is substantial variation in the extent to which U.S. multinationals report their foreign operations on a country-by-country basis. In practice, a significant number of firms aggregate their financial information at higher levels in response to the preferences of corporate managers or better informed investors (Herrmann and Thomas 2000; Akamah et al. 2017). Such aggregation reduces firm transparency and increases monitoring costs, thereby, discouraging monitoring activities by indexed investors. I argue that one implication of the higher monitoring costs is that indexed investors may strategically ration their relevant resources[16], directing them towards firms more exposed to information asymmetries and governance problems. In a similar vein, Crane, Michenaud, and Weston (2016) present evidence that indexed investors are effective corporate monitors especially in firms with potentially higher agency costs; evidenced by the stronger positive effect on corporate pay-out policies for these firms[17].

Findings of prior studies are consistent with the resource rationing view of indexed investors. Appel et al. (2016) argue that investors may engage in widespread, but "low-cost" monitoring activities. One way could be by voting for their shares according to recommendations provided by proxy advisors (Malenko and Shen 2016). Schmidt and Fahlenbrach (2017) present evidence that indexed investors are less effective as corporate monitors when monitoring activities entail "high-costs" (i.e. monitoring M&A transactions).

[16] Monitoring activity by indexed investors on every firms of their large and diversified portfolios may be limited by a cost-minimization strategy or lack of resources.

[17] Crane et al. (2016) measure high agency costs using the accumulation of the roles of CEO and Chairman, low growth options, low profitability, high free cash flow and large board size.

Furthermore, a few studies document increased governance problems in firms that, following the implementation of SFAS 131 (now ASC 280), no longer disclose their geographic earnings. For example, Hope and Thomas (2008) provide evidence that non-disclosing companies experience higher foreign sales, lower foreign profit margins and lower firm value, relative to companies that continue to disclose geographic earnings. These findings are consistent with corporate managers undertaking suboptimal ("empire building") decisions, which have detrimental effects on shareholder value, as a result of the less transparent environment brought about by the adoption of SFAS 131.

Hope, Ma, and Thomas (2013) find that firms that no longer disclose their earnings by geographic area register lower effective tax rates and Akamah et al. (2017) show that companies with tax haven operations tend to aggregate their geographic disclosure to a greater extent; thereby, making income shifting activities less transparent. Overall, these findings suggest that following the implementation of SFAS 131 corporate managers enjoy some level of discretion in reporting and aggregating financial information of firms' geographic operations with potential implications for firm transparency.

In this chapter, I posit that indexed investors, due to high information asymmetries and related monitoring costs, are less likely to demand increased geographic disclosure in every firm of their generally large and diverse portfolios (i.e., all firms included in the tracked index). In contrast, I argue that indexed investors can choose to strategically allocate their resources and promote country-level operation disclosure in those firms that are exposed to greater information asymmetries and agency problems. More specifically, I examine firms' tax haven operations as a source of asymmetric information between managers and shareholders that can trigger indexed investors' preferences for informational transparency.

There are compelling reasons why indexed investors would exert influence on country-level disclosure in their investee firms. First, unlike their active counterparts that can trade based on private information, indexed investors are subject to greater information asymmetries and may, thereby, favour improvements in the information environment. Country-level disclosure can benefit shareholders because it increases firm transparency concerning profitability, risk and uncertainties of firms' geographic operations (Hope and Thomas 2008; Akamah et al. 2017). Second, indexed investors

can incur larger costs from acquiring private information and from engaging in monitoring activities because of their generally large portfolios, which encompass diverse holdings. Improved geographic disclosure reduces information acquisition costs and makes monitoring over corporate management more accessible to shareholders (Easley and O'Hara 2004; Graham, Harvey, and Rajgopal 2005; Boone and White 2015). Finally, indexed investors can benefit from enhanced monitoring as their intervention can improve firm performance whereas disinvestment (which is associated with changes in the index membership status of the investee firms) is a less viable governance channel (McCahery, Sautner, and Starks 2016).

A number of studies support the view that indexed investors act as effective corporate monitors (Appel et al. 2016; Crane et al. 2016). Moreover, Boone and White (2015), Bird and Karolyi (2016) and Schoenfeld (2017) find that indexed ownership is associated with greater corporate transparency and information production in the forms of management disclosure, analyst following and liquidity[18].

However, the monitoring role of indexed investors could be more complex than originally thought. Schmidt and Fahlenbrach (2017) show that stockholdings of indexed investors experience greater accumulation of roles, fewer independent director appointments and worse M&A transactions because of the high monitoring costs that such activities may entail. Differently from management guidance, index-tracking institutions are likely to incur higher costs to monitor (or promote) country-level operation disclosure in their diverse holdings. In such a setting, indexed investors can act as effective corporate monitors by strategically allocating their monitoring effort to those firms experiencing information asymmetries and governance problems.

I conduct my analysis using a sample of U.S. firms that explicitly define their operating segment by geographic area. My sample spans from 1998 to 2016, a post-SFAS 131 period. I find that companies with larger indexed ownership are overall less transparent with respect to their geographic operations. Yet, this effect is less pronounced for firms that are exposed to greater information asymmetries and governance problems. My results thus indicate a strategic allocation of resources from index investors with respect to their monitoring activities. I proxy for weaknesses of

[18] Prior studies examining the effect of indexed investors on firms' information environment have primarily focused on the information embedded into the Securities and Exchange Commission (SEC) Form 8-K filings concerning management earnings guidance.

firms' governance structures using tax haven operations, accumulation of roles and the entrenchment index (McCahery et al. 2016; Akamah et al. 2017; Schmidt and Fahlenbrach 2017; Schoenfeld 2017; Dyreng et al. 2018). Following Cremers and Pareek (2016), I find that my results are consistent using two different samples of indexed ownership. The first sample relates to the equity holdings of 13F - indexed institutional investors as reported by the Factset LionShare database, while the second sample consists of firms held by S12 - indexed mutual funds as from the Thomson Reuters database.

To provide causal support to my results, I exploit two sources of exogenous variation to indexed ownership. First, I conduct a difference-in-differences (DID) analysis using a SEC's exemptive relief order allowing mutual funds to invest in iShares Exchange Traded Funds (ETFs) in excess of the maximum amount outlined in section 12(d) of the Investment Company Act of 1940 from May 2003 onwards. Second, I take advantage of the discontinuity surrounding Russell index inclusion to implement both instrumental variable (IV) and regression discontinuity (RDD) analyses.

Overall, my results suggest that indexed investors are less likely to monitor country-by-country operation disclosure of every company of their large and diversified portfolios. However, this class of shareholder acts as effective corporate monitors of country-level operation disclosure in firms that are in greater need of monitoring and informational transparency. I thus show evidence of a more nuanced approach of indexed investors in their demand for increased informational transparency in their investee firms.

My findings can be relevant for policymakers and corporate stakeholders when designing policies aimed to provide greater transparency about firms' geographic operations. At international level, the comparability between the IFRS 8 and SFAS 131, resulting from an ongoing convergence project between IFRS and US GAAP, makes my results informative also for those countries implementing IFRS principles. Unlike anecdotal evidence, I show that indexed investors act as effective corporate monitors, as their presence is associated with greater country-by-country operation disclosure in firms that are exposed to greater information asymmetries and governance problems.

The remainder of this chapter is organized as follows. Section 3.2 provides details on the data and research design. Section 3.3 discusses my findings. Section 3.4 presents robustness tests and Section 3.5 concludes.

3.2 Data and research design

I conduct my analysis on a sample of U.S. publicly listed firms reporting geographic segment disclosure in the years 1998-2016. I start my sample in 1998 because from this year onwards a new accounting standard - ASC 280 or former SFAS 131 - requires financial information for each "material" country in which companies lead their operations. I remove firm-year observations for which the necessary data is unavailable from the whole Compustat population. I further restrict my sample to industries - defined using the Fama-French 48 industry classification - with at least forty observations. I then merge this data with ownership-level data. Following Cremers and Pareek (2016), I conduct my analysis using two different samples of indexed ownership. The first sample includes U.S. publicly listed firms held by institutional investors from Factset LionShares - 13F - database. The second sample consists of U.S. stock holdings by mutual funds as reported in Thomson Reuters - S12 - database. To conclude, I winsorize all my continuous variables at 1% to mitigate the influence of extreme values on my analysis.

3.2.1 Geographic segment disclosure variables

I limit my sample to companies that define their operating segment by geographic area. I measure (country-level) geographic segment disclosure using an indicator variable that equals one if a firm includes the name of at least one foreign country in the segment reporting on the notes of its financial statements and zero otherwise (Country disclosure). To calculate this variable, I code the names of the 195 countries in the world as from the list of the U.S. Department of State - https://www.state.gov/misc/list/.[19] I also measure aggregate disclosure using an indicator variable that equals one if a company aggregates its foreign operations in one

[19] For several countries I code various name combinations (i.e. "United Kingdom", "Great Britain" and "Britain") and acronyms (i.e. "United Arab Emirates", "UAE" and "U.A.E.") to capture country-level geographic reporting.

single "Other", "Foreign", "International" or "Rest of the World" entry (Aggregated disclosure); this can thus be considered as an inverse measure of firms' informational transparency with respect to their geographical operations.[20]

Table A.3.2 of the Appendix shows three examples of geographic segment disclosure as shown in the notes of the financial statements. The three examples present financial information by geographic area from the highest to the lowest level of aggregation. All firms belong to the Computer industry. In the first example, Dell Technology Inc. divides geographic information about net revenues and long-lived assets between "United States" and "Foreign countries". No other country apart from the United States represents more than 10% of Dell's total revenues. This level of aggregation provides little information about geographic profitability, exposure and risks to shareholders and other corporate stakeholders and signals a low level of transparency of the firm's foreign operations.

In the second example, Alphabet Inc. reports geographic net revenues and long-lived assets by macro-regions; namely "United States", "EMEA", "APAC" and "Other Americas". Similar to the first example, this level of aggregation of the company's geographic operation evidences low transparency about profitability and risks of the firm's foreign markets. Finally, in the third example, Oracle Corporation presents geographic disclosure of financial information disaggregated at country level into entries such as "United States", "United Kingdom", "Japan", "Germany", "Canada" and "Other countries"; each representing at least 3% of the company's total revenues.

Panel A of Figure 3.1 shows the number of companies reporting country-level financial information per year. Since 1999, the year after the adoption of SFAS 131 now ASC 280, the number of disclosing firms has grown and is more than 20% higher in 2016. Panel B of Table 3.1 presents the percentage of firms reporting their operations at country-level relative to the total number of firms that define their operating segments by geographic area. Consistent with Panel A, Panel B shows that country-level disclosure as a percentage of total geographic disclosure increased over time and is about 11% higher in 2016 compared to its 1999 level.

[20] Untabulated results using Aggregated disclosure as dependent variable show a positive association between index investors and more aggregated disclosure.

3.2.2 Indexed institutional ownership variables

Following Cremers and Pareek (2016), I conduct my analysis using two different samples of indexed ownership. The first sample includes U.S. publicly listed firms held by institutional investors from Factset LionShares - 13F - database. The second sample consists of U.S. stock holdings by mutual funds as reported in Thomson Reuters - S12 - database.

Factset LionShares includes data on the stockholdings of professional fund managers, such as investment banks, insurance companies, mutual funds, pension funds and hedge funds, managing $100 million or more as reported by the mandatory N-30D and 13F filings with the Security Exchange Commission (SEC)[21]. I identify indexed institutional investors based on a flag assigned by the Factset research staff to institutions whose stated objective from publicly available reports is index tracking. I, then, calculate indexed institutional ownership at firm-level as the sum of the holdings of all institutions that are flagged as index in the database divided by the stock's market capitalization (Index IO).

Similarly, I also define hedge funds as those institutions whose investment style is classified as "Hedge fund" (Hedge IO) and active investors those whose flag is different from index (i.e. GARP, Yield, Deep Value, Value, Growth and Aggressive Growth). I label all investors that are not flagged by the Factset research staff as unclassified institutions.

To find index-tracking mutual funds in the Thomson Reuters database, I adopt a similar approach to that of Busse and Tong (2012), Iliev and Lowry (2015) and Appel et al. (2016). I merge mutual fund data from Thomson Reuters and CRSP Mutual Fund Database using the MFLINKS table available on WRDS. I then generate an indicator variable that equals one if a fund name on CRSP includes a string that identifies it as an indexed investor and zero otherwise[22]. Based on this indicator variable, I then calculate indexed mutual fund ownership at firm-level as the sum of the holdings of all funds that are classified as index divided by the stock's market capitalization. I also

[21] See Ferreira and Matos (2008) for more details on the data coverage of Factset LionShares database.
[22] In line with Appel et al. (2016), the strings I use to identify indexed mutual funds are: Index, Idx, Ind_ (where _ indicates space), Russell, S & P, S and P, S&P, SandP, SP, DOW, Dow, DJ, MSCI, Bloomberg, KBW, NASDAQ, NYSE, STOXX, FTSE, Wilshire, Morningstar, 100, 400, 500, 600, 900, 1000, 1500, 2000 and 5000.

classify all mutual funds other than indexed as actively managed. All my explanatory variables are lagged by one year to mitigate simultaneous causality concerns.

Table 3.1 presents the descriptive statistics of indexed ownership for my sample of firms that report geographic segment information. Indexed 13F institutional ownership is on average 6% of firms' market capitalization while indexed S12 mutual fund ownership is on average 3% of firms' market capitalization. Figure 3.2 shows the year-averages stock holdings by indexed 13F institutional investors (Panel A) and S12 mutual funds (Panel B). Both Panels show an upward trend in indexed ownership, with 13F institutional investors increasing their average stock holdings by 80% between 1999 and 2016 and S12 mutual funds registering higher ownership levels by 40% during the same period.

3.2.3 Tax haven variables

Akamah et al. (2017) show that U.S. multinationals that are found to conduct their operations in tax haven countries tend to reduce informational transparency by aggregating their geographic disclosure at regional or macro-regional level or in a single "Total Foreign" entry. By doing so, managers can conceal financial information about tax haven activities to avoid unwanted public and regulatory scrutiny on firms' tax planning strategies. In a similar vein, Balakrishnan, Blouin, and Guay (2019) find that tax aggressive firms are characterized by lower financial transparency, proxied by analysts' forecast errors and dispersions and bid-ask spread.

Akamah, Hope, and Thomas (2017) and Balakrishnan, Blouin, and Guay (2019) overall seem to suggest that information asymmetries are more severe in companies with tax haven operations and tax aggressive strategies. This can be a substantial cause of concerns for indexed investors who, due to limited resources and large portfolios, likely rely on publicly available information for monitoring (Boone and White 2015). I examine indexed investors' monitoring motives by including Haven countries and Haven subsidiaries as proxies for information asymmetries. Haven countries is an indicator variable equal to one if the majority of the countries in which firms conduct their operations are tax havens and zero otherwise (Akamah, Hope, and Thomas 2017), and Haven subsidiaries is an indicator of whether the majority of a firm's

subsidiaries are domiciled in tax haven countries.[23] I predict a positive effect of Index IO on geographic segment disclosure when firms have tax haven operations.

3.2.4 Control variables

My analysis includes several control variables to help separate the effect of indexed institutional ownership on geographic segment disclosure from other firm-specific characteristics. The first set of control variables captures firms that are arguably subject to greater informational transparency and are more likely to be included in market indexes (Ln (market value), Domestic pretax income, Foreign pretax income and Multinational). First, I include firm size and domestic profitability in my model specification to control for a greater demand for, and benefit of, transparency in larger and profitable firms (Lang and Lundholm 1996; Miller 2002; Boone and White 2015; Bourveau and Schoenfeld 2017). Second, I add foreign profitability and an indicator variable for multinationals as firms with profitable foreign operations are more likely to report their operations at country level (Atwood, Drake, Myers, and Myers 2012; Hope et al. 2013).

The second set of control variables includes proxies for the availability of firm-specific information (Analysts following, Forecast accuracy, Forecast diversity, Discretionary smoothing and Big 5 auditor) to disentangle the effect on geographic disclosure from the information environment (Maffett 2012). First, the presence of analysts and Big 5 auditors should increase transparency. Analysts following is, for each firm-year, the number of analysts issuing earnings forecasts and Big 5 auditor is an indicator of whether a firm is audited by a global accounting firm. Second, following Lang, Lins, and Maffett (2012), I add proxies for the accuracy and diversity of analysts' earnings forecasts. High levels of Forecast accuracy indicate greater transparency whereas high Forecast diversity suggests firm-level opacity. Finally, I add Discretionary smoothing because prior studies have found that discretionary earnings smoothing is associated with higher levels of opacity (Leuz, Nanda, and Wysocki 2003, Lang, Lins, and Maffett 2012).

[23] Subsidiary-level data and the list of tax haven countries is taken from Scott Dyreng's website: https://sites.google.com/site/scottdyreng/Home/data-and-code.

The third set of control variables includes Leverage, Market-to-book, Intangibles and Turnover (Beyer, Cohen, Lys, and Walther 2010; Boone and White 2015). While companies with larger external debts are subject to stricter disclosure requirements, firms with growth opportunities and intangible assets may be more exposed to proprietary costs of disclosure. Finally, I control for stock Turnover because managers can use voluntary disclosure to improve liquidity of their firms' shares (Balakrishnan, Billings, Kelly, and Ljungqvist 2014). I lag all my control variables by one year to mitigate simultaneous causality concerns.

Table 3.1, Panels A and B, shows descriptive statistics for all variables. On average, indexed institutional investors own 9% of their investee firms (Panel A) whereas indexed mutual funds hold about 4% of shares (Panel B). Hedge funds ownership is 7% in the two samples. The average firm is large and profitable, is audited by a global accounting firm and has a median of seven analysts assessing its earnings.

3.2.5 Correlation matrix

Table 3.2 reports pairwise correlations between my variables. The univariate association between Country disclosure and Index IO is negative but statistically insignificant, indicating that there may be additional factors affecting such a relationship. Large correlation coefficients on Country disclosure indicate that companies providing country-level financial information are more likely to be multinationals with profitable foreign operations. Furthermore, univariate statistics show that indexed investors (Index IO) are more likely to target high market cap (Ln (market value) and liquid (Turnover) stocks whose earnings are assessed by a larger number of analysts (Analysts following).

3.2.6 Research design

I begin my analysis of the effect of indexed ownership on geographic segment disclosure using Probit regressions. Yet, this approach raises concerns about potential endogeneity issues affecting my results. For example, indexed investors may find themselves investing in firms that prior to index inclusion were already engaging in an enhanced level of transparency with respect to their geographic operations. If this is the case, results may reflect the role played by the information environment in

determining firms' index inclusion and therefore miss out the actual effect I aim to estimate. I address this issue by exploiting multiple sources of exogenous variation in indexed ownership.

My primary empirical strategy for identifying the effect of Index IO on geographic segment disclosure exploits an exemptive relief order released by the Security Exchange Commission (SEC) to iShares Exchange Traded Funds (ETFs) using a difference-in-differences (DID) design. ETFs are indexed funds which can amass significant holdings in their portfolio firms and, due to their long-term investment strategy, can have a special interest in shaping management decisions that foster long-term value creation[24]. Similar to other indexed investors, however, their monitoring activity is constrained by resources, which makes ETFs' providers more sensitive to the information environment of their investee firms.

Beginning in May 2003, an exemptive order released by the SEC allows mutual funds to invest in iShares ETFs in excess of the maximum amount outlined in section 12(d) of the Investment Company Act of 1940[25]. Because ETFs can be traded as stocks throughout the trading day and are highly liquid, demand shocks for ETFs likely transfer to the shares of the firms in the ETFs' portfolio. Figure 3.3 shows that the SEC's exemptive order has led to a large increase in equity investments by iShares ETFs from 2003 onward relative to other ETFs. In this setting, my "treatment group" includes firms held by iShares Exchange Traded Funds while my corresponding "control group" consists of companies held by Exchange Traded Funds other than iShares. Firms in the control group represent the best match of firms in the treatment group.

My difference-in-differences equation is:

$$\text{Country disclosure} = \alpha + \beta\ \text{Treated} \times \text{Post} + \gamma\ \text{Treated} + \delta\ \text{Post} + \theta\ \text{Controls} + \text{Industry FE} + \text{Year FE} + \varepsilon, \quad [1]$$

[24] iShares ETFs' provider BlackRock influences managerial decisions of iShares ETFs' investee firms by voting for their shares in line with BlackRock's voting policies. Medium-sized ETF providers often delegate their voting rights to proxy advisory firms (JustETF 2018).

[25] Section 12(d) prohibits an investment company from acquiring more than 3% of the total outstanding voting shares of another investment company. Secondly, it restricts investment companies from investing more than 5% of their total assets in a single investment company. The section also prohibits investing more than 10% of total assets in two or more investment companies

where, for each firm-year, Treated is an indicator for firms in the treatment group, Post indicates the post-SEC's exemptive-order period and Treated × Post is the interaction term. The analysis is led on a two-year event window before and after May 2003.

My second empirical strategy is an instrumental variable (IV) approach which relies on the plausibly exogenous variation in Index IO that follows a firm's inclusion in the Russell index (Boone and White 2015; Crane, Michenaud, and Weston 2015; Appel et al. 2016). The underlying assumptions of this approach are that (1) index membership largely explains variations in Index IO ("relevance condition") and (2) index inclusion is uncorrelated to disclosure policies concerning the location of foreign operations, and their determinants, outside through its effect on Index IO ("exogeneity condition").

In this section, I argue that my instrument is (2) exogenous as it is unclear whether firms can affect their relative market capitalization ranking which is based on the index weights constructed by Russell using proprietary adjustments[26]. However, larger firms are potentially subject to greater disclosure requirements than their smaller counterparts, and firm size is correlated to changes in index membership. To mitigate concerns that the "exogeneity condition" is violated, I restrict my analysis to the ±300 companies surrounding the Russell 1000/2000 index threshold in a sample that includes only firms assigned to either the Russell 1000 or the Russell 2000. Variations in Indexed IO for this subset of firms is more likely to be exogenous to their geographic segment disclosure policies. Figure 3.4, Panels A and B, shows the discontinuity around the Russell 1000/2000 index threshold.

Russell makes some proprietary adjustments to the end-of-May market capitalization ranking based on the publicly available float to construct its index weights. Such index weights are then used by Russell to produce the end-of-June ranking, which ultimately drives indexed ownership. Because of the proprietary adjustments, index membership could be correlated with some firm characteristics other than market capitalization rankings. This would invalidate my IV approach. I address this issue by interacting actual index assignments (Russell 2000) with the end-of-May's market capitalization rankings (Rank adjusted) and by controlling for a

[26] I provide evidence on (1) the instrument relevance in the Results section. Graphically, Panels A and B of Figure 3.4 show the discontinuity in Index IO around the Russell 1000/2000 index threshold.

number of factors (such as hedge fund ownership, shares' turnover and managerial discretion over reported earnings) that can affect Index IO, Russell 2000 and Rank adjusted in my IV regressions.

My first- and second-stage equations are:

$$\begin{aligned}\text{Index IO}_{it} = {} & \alpha + \beta\text{Russell 2000}_{it} + \theta\text{Rank adjusted}_{it} \\ & + \mu\ \text{Russell 2000}_{it} \times \text{Rank adjusted}_{it} + \sigma\ \text{Controls}_{it} \\ & + \varphi\ \text{Banding controls}_{it} + \text{Industry FE} + \text{Year FE} + \varepsilon_{it} \end{aligned} \quad [2]$$

$$\begin{aligned}\text{Country disclosure}_{it} = {} & \gamma + \rho\ \widehat{\text{Index IO}}_{it-1} + \pi\ \text{Controls}_{it-1} + \\ & \omega\ \text{Banding controls}_{it-1} + \text{Industry FE} + \text{Year FE} + \varepsilon_{it}, \end{aligned} \quad [3]$$

where, for each firm-year, Russell 2000_{it} indicates actual index membership, Rank adjusted_{it} is the distance of the end-of-May's market capitalization rankings to the threshold and their interaction, Russell 2000_{it} × Rank adjusted_{it}. The instrumental variables, Russell 2000_{it}, Rank adjusted_{it} and Russell 2000_{it} × Rank adjusted_{it} are excluded from the second-stage specification.

In 2007, Russell introduced a new banding policy which affects the index assignment rule. The new policy allows Russell to keep a stock in its current index if the stock experiences only a small change in market capitalization[27]. Under the new rule, index assignment is related to firms' characteristics other than market capitalization rankings, which can violate the "exogenous condition". To mitigate concerns that my results are affected by the banding policy, I control for firms that, after 2006, do not switch index at the reconstitution date despite having their end-of-May market capitalization ranking crossing the index threshold, Band_{it}, and for the interaction between Band_{it} and the index assignment in the previous year, Band_{it} × Russell 2000_{it-1} (Appel, Gormley, and Keim 2018).

Both instrumental variables and difference-in-differences approaches have advantages and disadvantages. After including control variables in the first-stage

[27] Beginning in May 2007, a stock is "banded" by Russell and does not switch index at the reconstitution year if the distance between its market capitalization and the Russell 1000/2000 cutoff is less than 2.5% of the cumulative market capitalization of the Russell 3000E Index (Appel et al. 2018).

regressions, I show that Russell index inclusion is unrelated to firms' geographic disclosure policies and their determinants. However, this approach raises concerns that the effect on geographic segment disclosure around the Russell 1000/2000 indexes cutoff is only local and mainly driven by smaller companies whose disclosure requirements are arguably lower. The use of a difference-in-differences design helps address these concerns. First, this methodology covers on the whole sample of treated and control companies making estimates non-local and, second, it helps focusing on larger companies, subject to ETFs acquisitions. Yet, my difference-in-differences analysis encompasses only one fund, iShares ETFs, which can make results less generalizable. As a result, I believe that the combination of the two empirical approaches, addressing one another limitations, can provide greater validity to the effect I aim to estimate.

3.3 Results

3.3.1 Elimination of investing limits in ETFs: Quasi-natural experiment

To provide causal support to the effect of indexed ownership on geographic segment disclosure, I take advantage of a quasi-natural experimental setting offered by the SEC's elimination of investing limits in iShares Exchange Traded Funds (ETFs). Before May 2003, Section 12(d) of the Investment Company Act of 1940 restricted mutual funds from (1) acquiring more than 3% of the total outstanding voting shares of another investment company, (2) investing more than 5% of their total assets in a single investment company and (3) more than 10% in two or more investment companies. From May 2003 an exemptive relief order released by the SEC permits mutual funds to invest in iShares Exchange Traded Funds (ETFs) in excess of the limits outlined in Section 12(d).

Mutual funds largely benefit from the elimination of investing limits in ETFs (Financial Planning 2003). By acquiring ETFs, mutual funds can have immediate exposure to equities while taking the advantages of ETFs' high liquidity (ETFs can be traded at any point during a trading day), low capital gain taxes (because of the redemption "in-kind" mechanism), low portfolio turnover (given that ETFs track specific market indexes) and thereby low transaction costs. Two reasons make the SEC's exemption relief order of May 2003 particularly relevant to my study. First,

demand shocks for ETFs likely transfer to the shares of the firms in the ETFs' portfolio. On this spirit, Figure 3.3 shows a sharp increase in equity holdings by iShares ETFs following the SEC's exemptive order relative to other ETFs. Second, the exemptive relief order of May 2003 was only granted to investments in iShares ETFs whereas all the other ETFs traded in the U.S. market were still subject to the limits of Section 12(d) of the Investment Company Act of 1940.

My primary research approach consists of a difference-in-differences (DID) analysis around the elimination of mutual funds' investing limits in iShares ETFs. My treatment group includes investee firms of iShares ETFs whereas my control group consists of firms included in the portfolios of other (non-iShares) ETFs. Tests are led on a sample that encompasses only firms in the treatment and control groups. Firms are matched using propensity score matching (PSM) without replacement based on several lagged (two years) covariates and industry classifications.

Panel A of Table 3.3 shows the differences in means between treated and control groups for all the variables used in the study in the two years preceding the elimination of investing limits in iShares ETFs. I mitigate concerns of these differences affecting my results by including all variables in my difference-in-differences (DID) analysis in Panel B. The interaction term Treated × Post in Panel B captures variations in the effect of the SEC's exemptive order for companies included in iShares ETFs' portfolios relative to those held by ETFs other than iShares[28]. I find a negative and significant coefficient on Treated × Post, which indicates a negative effect of indexed ownership on geographic segment disclosure. More specifically, the marginal effect at the bottom of Column 1 of Panel B suggests that a 1-percent increase in iShares ETFs ownership following the elimination of investing limits outlined in Section 12(d) of the Investment Company Act of 1940 leads to a reduction of 12 percentage points in the probability of Country disclosure relative to investee firms of other non-iShares ETFs.

The dependent variable, Country disclosure (excl. Canada), in Column 2 is an indicator equal to one if a company provides financial information for at least one foreign country in which it leads its operations excluding Canada and zero otherwise. Similar to Column 1, the coefficient estimate on Treated × Post in Column 2 is negative and statistically significant, suggesting that an exogenous increase in indexed

[28] Untabulated results show that the parallel trend assumption is also met.

ownership leads firms to provide fewer country-level information about profitability, risks and uncertainties of their foreign operations. I find similar results after dropping the year in which the SEC released the exemptive relief order to investments in iShares ETFs (i.e. 2003) from the post-treatment period. These findings, overall, lend support to the view of indexed investors as "passive owners" (Schmidt and Fahlenbrach 2017) when it comes to geographic segment disclosure.

3.3.2 The role of tax haven operations: Quasi-natural experiment

I now examine the role of indexed investors in companies that are more exposed to information asymmetries. Akamah et al. (2017) provide evidence that U.S. multinationals with tax haven operations tend to aggregate their geographic disclosure to a larger extent, reducing informational transparency. In such a setting, I posit that indexed investors would favour greater disclosure about firms' geographic segments when firms conduct large part of their activities in tax havens as this would reduce information acquisition costs, making monitoring over corporate management more accessible.

Table 3.4, Panels A and B, presents the results of my difference-in-differences (DID) analysis. The interaction term Treated × Post × Haven countries in Panel A captures the effect of SEC's exemptive order for companies included in iShares ETFs' portfolios that lead their operations in tax havens (i.e. % haven countries). The coefficient estimate on Treated × Post × Haven countries in Column 1 of Panel A is positive and significant, suggesting that indexed ownership is positively associated with Country disclosure in firms that lead their operations in tax haven countries. The marginal effect at the bottom of Column 1 indicates that a 1-percent increase in ownership by iShares ETFs leads to about 1.6 increase in the probability of country-level operation disclosure. This finding is consistent with my hypothesis of indexed investors increasing monitoring in companies that are exposed to greater information asymmetries and governance problems.

I find similar results when I exclude Canada from the list of foreign countries in which U.S. multinationals conduct their activities (Column 2) and when I exclude the year in which SEC released the exemptive relief order (i.e. 2003) from the post-

treatment period (Columns 3 and 4). Across the four columns of Panel A, I also find that Treated × Post is negatively associated with Country disclosure and Country disclosure (excl. Canada), which is consistent with my results in Panel B of Table 3.3. Furthermore, the coefficient estimates on Treated × Haven countries are negative and significant. This result indicates that country-level disclosure is less likely in the investee firms of iShares ETFs that lead their operations in tax haven countries as for these companies information asymmetries are likely higher.

In Panel B of Table 3.4, I present the results of the difference-in-differences (DID) analysis using Haven subsidiaries as an indicator for firms having the majority of their subsidiaries in tax haven countries (i.e. % haven subsidiaries). Similar to Panel A, I find a positive and significant coefficient on Treated × Post × Haven subsidiaries in Column 1 of Panel B. That is, companies included in iShares ETFs' portfolios are more likely to report country-by-country financial information when they lead the majority of their foreign operations using tax haven subsidiaries. The marginal effect at the bottom of Column 1 suggests that a 1-percent increase in iShares ETFs ownership leads to a 1.8 increase in the probability of Country disclosure, ceteris paribus. This finding overall presents evidence that indexed investors are more likely to direct their resources towards those firms that, due to larger information asymmetries, are in greater need of monitoring.

In Column 2, I replace my dependent variable with Country disclosure (excl. Canada) whereas in Columns 3 and 4 I exclude the year in which the SEC's exemptive relief order was released (i.e. 2003). Overall, results are consistent with the above analysis and my research hypothesis of a selective approach to monitoring by index-tracking institutions. Similar to Table 3.3, I also find that the coefficient on Treated × Post is negative and statistically significant, suggesting that indexed investors are in general "passive owners" when it comes to geographic segment disclosure. Yet, indexed investors increase monitoring on those firms that are more exposed to information asymmetries and governance problems, as proxied by tax haven operations.

3.3.3 Russell 1000/2000 assignment: Instrumental variable approach

Table 3.5 presents the results of Probit and IV Probit regressions of geographic segment disclosure into indexed institutional ownership (Panel A) and mutual fund ownership (Panel B). In Column 1, the dependent variable Country disclosure is an indicator of whether a firm reports the name of at least one foreign country in which it leads its operations. The coefficient estimate on Index IO is negative and significant, which suggests that an increase in indexed ownership reduces the probability of country-level disclosure. The marginal effect at the bottom of Column 1 indicates that a standard deviation (0.07) increase in equity investments by indexed institutions is associated with a 5.25 percentage point reduction in Country disclosure, ceteris paribus [0.07×(-0.75)×100].

To mitigate concerns of firms engaging in an enhanced level of disclosure prior to index inclusion, I exploit the plausibly exogenous variation in indexed ownership that follows a company's index assignment around the Russell 1000/2000 cutoff using an instrumental variable (IV) approach. Column 2 reports the results of my first-stage regression from equation [2] using a bandwidth of ±300 firms around the threshold. The effect of Russell 2000 on Index IO is positive and significant. Consistent with Gloßner (2018), I find that indexed institutional ownership increases by about 0.5 percentage points following the assignment of a company into the Russell 2000 index relative to similar stocks included in the Russell 1000. Figure 3.4, Panel A, shows the discontinuity for 13F - Indexed Institutional Ownership.

Importantly, my empirical strategy also addresses concerns that, due to Russell's proprietary float adjustments, firm characteristics other than market capitalization rankings could affect Index IO. More specifically, I include the same control variables in my first- and second-stage regressions to mitigate these concerns. First-stage results reported in Column 2 show positive and significant coefficients on Turnover and Discretionary smoothing, which suggests that shares' liquidity and managerial discretion in reported earnings play a role on indexed institutional ownership besides the effect of index assignment and market capitalization rankings.

Column 3 of Panel A presents a negative and significant coefficient on Index IO, indicating that firms with larger indexed institutional ownership are less likely to disclose their financial information at country-level. The marginal effect at the bottom of Column 3 suggests that a standard deviation (0.07) increase in Index IO is associated with a lower probability of firms disclosing their operations country-by-country of

about 41.3 percentage points, ceteris paribus [0.07×(-5.9)×100]. Column 4 displays similar results when the dependent variable Country disclosure (excl. Canada) excludes Canada from the list of foreign countries in which companies defining their operating segments by geographic area lead their operations.

Results for S12 – indexed mutual funds in Panel B of Table 3.5 are consistent with those for 13F – indexed institutional investors in Panel A and above analysis. The magnitude of the effect of indexed ownership is larger in Column 1. The marginal effect at the bottom of Column 1 suggests that a standard deviation (0.04) increase in Index IO is associated with a reduction of Country disclosure by 4.48 percentage points [0.04×(-1.12)×100], ceteris paribus. The larger negative effect of Index IO is also reflected in the second-stage results of Columns 3 and 4. Overall, these results are consistent with the view of indexed investors trading-off costs and benefits of monitoring all the companies of their large portfolios when it comes to geographic segment disclosure.

3.3.4 The role of tax haven operations: Instrumental variable approach

I now examine the role of information asymmetries, proxied by tax haven operations, on geographic segment disclosure around the Russell 1000/2000 cutoff. Panel A of Table 3.6 presents the results for 13F – indexed institutional investors. The coefficient estimate on the interactive term Index IO × Haven countries in Column 1 is positive and significant, suggesting that the negative effect of indexed investors on Country disclosure is less pronounced for firms operating in tax haven countries. The coefficient on the interaction term in Column 2 is still positive but statistically insignificant. One reason of this can be attributed to corrections to end-of-May's market capitalization rankings[29] and bandwidth choice.

In Column 3, Index IO × Haven subsidiaries presents a positive and significant coefficient estimate, which indicates a positive effect of indexed investors on geographic segment disclosure in firms that largely take advantage of tax haven subsidiaries. Similar to Column 2, the coefficient estimate on the interaction term in Column 4 is positive but statistically insignificant when I exclude Canada from the list

[29] As discussed above in Section 2.5, I correct end-of-May's market capitalization rankings using actual end-of-June's Russell 1000/2000 index assignments.

of foreign countries for which companies provide financial information. These results overall provide evidence of a greater demand for country-by-country financial information by indexed investors in companies that are more exposed to information asymmetries and governance problems, as proxied by tax haven operations.

Panel B of Table 3.6 presents the results for S12 – indexed mutual funds ownership. Findings are overall consistent with Panel A and above analysis. Column 1 reports a positive and significant coefficient on Index IO × Haven countries, which suggests that an increase in indexed ownership is associated with improved Country disclosure in firms operating in tax haven countries. The coefficient on the interaction term is positive but statistically insignificant in Column 2. Column 3 presents a positive and significant coefficient on Index IO × Haven subsidiaries whereas the coefficient estimate in positive but statistically insignificant in Column 4. Overall, results are consistent with the view of indexed investors' monitoring motives being stronger in firms operating in tax haven countries.

3.3.5 Indexed ownership and CEO power

To provide additional support to my prediction, I investigate whether the effect of indexed investors on geographic segment disclosure could be explained by the preferences of powerful CEOs. I measure CEO power using the accumulation of roles (i.e. CEO-Chairman and CEO-President) and managerial entrenchment (i.e. E-index) (McCahery et al. 2016; Schmidt and Fahlenbrach 2017; Schoenfeld 2017).

Table 3.7 presents my regression results. The coefficient estimate on the interaction term IO Index × CEO-Chairman in Column 1 is positive and statistically significant, which means that the negative effect of indexed investors on geographic disclosure is less pronounced in firms with powerful CEOs. This result is consistent with the view of indexed investors engaging in greater monitoring over the offshore activities of firms at higher risk of governance problems. In Column 2 the coefficient on the interaction term is still positive although statistically insignificant.

Columns 3 and 4 report positive and significant coefficient estimates on IO Index × CEO-President and in Columns 5 and 6 the relation between IO Index × E-index and geographic segment disclosure is also positive and significant. Results in Panel B are consistent with my analysis above although coefficients on the interaction terms are statistically insignificant in Columns 1, 3, 5 and 6. Overall, findings suggest that

indexed investors have greater incentives to monitor corporate managers' disclosure policies when boards are less likely to question managerial activity.

3.3.6 Additional analysis

I further provide evidence on the effect of indexed institutional ownership on aggregated disclosure of a company's geographic operations (Aggregated disclosure). Results (untabulated) show that the presence of 13F - index institutional investors increases the likelihood of aggregation of foreign operations under a single entry labelled as "Foreign", "International", "Rest of the World" or "Other". The marginal effect suggests that a 1-percent increase in equity investments by indexed institutions is associated with a higher probability of aggregation of geographic segments by about 30 percentage points, ceteris paribus. Results for S12 - indexed mutual funds are consistent with those for 13F – indexed institutional investors in Panel A and above analysis. The coefficient estimate on Index IO is still positive but statistically insignificant for Aggregated disclosure.

3.3.7 Other robustness tests: Regression discontinuity design

Following Boone and White (2015) and Chen, Huang, Li, and Shevlin (2018), I implement a regression discontinuity design (RDD) around the Russell 1000/2000 cutoff to identify the effect on geographic segment disclosure. More specifically, I examine whether the probability of country-level operation disclosure differs around the cutoff for firms assigned to Russell 2000 using a conventional bandwidth of ±300. Similar to my analysis above, I construct rankings based on the end-of-May's market capitalization and correct those using actual end-of-June's index assignments after Russell introduced its banding policy in 2007.

Panel A of Table 3.8 presents the results of my RDD regressions fitting a local third (N=3) order polynomial using a triangular kernel to the left and right of the Russell 1000/2000 cutoff using the bias-correction methodology proposed by Calonico et al. (2015). Coefficient estimates on Russell 2000 are negative and significant for both Country disclosure and Country disclosure (excl. Canada) in Columns 1 and 2, respectively. In line with my analysis above, these results indicate that firms reduce informational transparency about their geographical operations

following an exogenous increase in indexed ownership. Findings are also robust to changes in the bandwidth from ±300 to ±200 and ±400. I find similar results when I measure indexed ownership using S12 - indexed mutual fund ownership, although coefficients on Russell 2000 are statistically insignificant for Country disclosure (excl. Canada).

In Table 3.9, I run a similar analysis to the tests reported in Table 3.6 replacing the ±300 bandwidth with ±200 and ±400. Results are consistent with the above analysis in that coefficient estimates on Index IO × Haven countries are positive and statistically significant in most regressions. This finding is in line with the view of indexed investors' motives for greater informational transparency being more important for firms exposed to information asymmetries, proxied by tax haven operations.

3.4 Concluding remarks

Using a sample of about 4,400 U.S. publicly listed firms over the years 1998-2016, I find that companies with larger indexed ownership are less transparent with respect to their geographic operations. Yet, this effect is less pronounced for firms that are exposed to greater information asymmetries and agency problems. I find these effects using two different samples of indexed ownership which include 13F - institutional investors and S12 - mutual funds, respectively. Moreover, I exploit a regulatory change to iShares Exchange Traded Funds as sources of exogenous variation in indexed ownership and stocks assignments to Russell 1000/2000 to mitigate endogeneity concerns. Overall, my results are consistent with the view that indexed investors strategically allocate their resources to improve informational transparency of their investee firms in greater need of monitoring.

APPENDIX

Table A.3.1. Variable Descriptions

Variable	Description
Geographic segment disclosure variables	
Country disclosure	Equal to one if a firm reports the name of at least one foreign country in which it leads its operations and zero otherwise (Compustat)
Country disclosure (excl. Canada)	Equal to one if a firm reports the name of at least one foreign country in which it leads its operations excluding Canada and zero otherwise (Compustat)
Aggregated disclosure	Equal to one if a firm aggregates its foreign operations under a single "Foreign", "International", "Rest of the World" or "Other" entry and zero otherwise (Compustat)
Institutional ownership variables	
Index IO	Sum of the holdings of all institutions or mutual funds that are identified as indexed for each firm divided by the firm's market capitalisation (Factset LionShares or Thomson Reuters)
Hedge IO	Sum of the holdings of all institutions that are identified as hedge funds for each firm divided by the firm's market capitalisation (Factset LionShares)
Control variables	
Ln (market value)	Natural logarithm of market price times common shares outstanding current (Compustat: prcc_c×csho)
Leverage	Leverage calculated as total debt divided by total assets (Compustat: lt/at)
Market-to-book	Market price at the end of the period times common shares outstanding at the end of the period divided by total assets (Compustat: (prcc_c×csho)/ceq)
Domestic pretax income	Domestic pre-tax income divided by total assets (Compustat: pidom/at)
Foreign pretax income	Foreign pre-tax income divided by total assets (Compustat: pifo/at)
Intangibles	Net intangibles divided by total assets (Compustat: intan/at)
Multinational	Equal to zero when foreign income taxes is missing or zero, and equal to one otherwise (Compustat: txfo)
Turnover	Daily trading volume divided by share outstanding (Compustat)
Transparency variables	
Analysts following	For each year, median number of analysts providing one-year-ahead EPS forecast (I/B/E/S)
Forecast accuracy	Percentile-ranked residual value from a regression of Raw accuracy on Earnings surprise and Forecast bias. Raw accuracy is the absolute value of the forecast error multiplied by -1 and divided by the stock price at the end of the previous year, Forecast error is the analysts' mean earnings forecast less the actual earnings reported by I/B/E/S Summary File and Earnings surprise is the change in actual earnings between two subsequent years divided by the stock price at the end of the previous year (I/B/E/S)
Forecast diversity	Percentile-ranked residual value from a regression of Raw diversity on Earnings surprise and Forecast bias. Raw diversity is the standard deviation of the firm's earning forecast produced by analysts for the following year minus the mean forecast and divided by the square root of analysts following the firm (I/B/E/S)

Discretionary smoothing	The combination of two commonly used measures of earnings management proposed by Lang et al. (2012): 1) the variability of net income relative to cash flows and 2) the correlation between accruals and cash flows. The two proxies are first regressed on a set of determinants of earnings smoothness (total assets, leverage, book-to-market value, sales volatility, frequency of accounting losses, length of the firm's operating cycle, sales growth, operating leverage, average cash flows from operations, year fixed effects and industry fixed effects). The average of the scaled percentile rank of the resulting residuals is then used to form the discretionary earnings smoothness measure
Big 5 auditor	Equal to one if auditing company is Big 5 and zero otherwise (Compustat: au)
Tax haven variables	
Haven countries	Equal to one if, according to Exhibit 21 data (Dyreng and Lindsey 2009), the majority of the countries in which a firm leads its operations are tax havens; and zero otherwise
Haven subsidiaries	Equal to one if, according to Exhibit 21 data (Dyreng and Lindsey 2009), the majority of foreign subsidiaries are domiciled in tax haven countries; and zero otherwise
Corporate governance variables	
CEO-Chairman	Equal to one if the CEO is also the Chairman of the board of directors and zero otherwise (Capital IQ)
CEO-President	Equal to one if the CEO is also the President of the board of directors and zero otherwise (Capital IQ)
E-index	For each firm-year, average score assigned to the following corporate governance characteristics Bebchuk, Cohen, and Ferrell (2009): a staggered board, limits to shareholder bylaw and charter amendments, poison pill, golden parachute and a super-majority requirement for mergers (Institutional Shareholder Services)
Russell index inclusion variables	
Russell 2000	Equal to one if a firm is included in the Russell 2000 index in the current year and zero otherwise (Bloomberg)
Rank adjusted	End-of-May market capitalization ranking adjusted for Russell 1000 membership. The ranking is constructed on a sample of firms that at the Russell index reconstitution date (end of June) are included in either Russell 2000 or Russell 1000 (Bloomberg)

Table A.3.2. Examples of Geographic Segment Disclosure

Examples of different levels of aggregation of geographic information in the Computers industry. Examples 1, 2 and 3 show geographic segment reporting for Dell Technology Inc., Alphabet Inc. and Oracle Corporation, respectively.

Example 1. Dell Technology Inc.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

(Mark One)

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended February 3, 2017

Dell Technologies Inc.

(Exact name of registrant as specified in its charter)

The following tables present net revenue and property, plant, and equipment, net allocated between the United States and foreign countries:

	Fiscal Year Ended		
	February 3, 2017	January 29, 2016	January 30, 2015
	(in millions)		
Net revenue:			
United States	$ 30,699	$ 24,309	$ 25,099
Foreign countries	30,943	26,602	29,043
Total net revenue	$ 61,642	$ 50,911	$ 54,142

	February 3, 2017	January 29, 2016
	(in millions)	
Property, plant, and equipment, net:		
United States	$ 4,320	$ 1,172
Foreign countries	1,333	477
Total property, plant, and equipment, net	$ 5,653	$ 1,649

The allocation between domestic and foreign net revenue is based on the location of the customers. Net revenue from any single foreign country did not constitute more than 10% of the Company's consolidated net revenue for the fiscal year ended February 3, 2017, January 29, 2016, or January 30, 2015. Property, plant, and equipment, net from any single foreign country did not constitute more than 10% of the Company's consolidated property, plant, and equipment, net as of February 3, 2017 or January 29, 2016.

Example 2. Alphabet Inc.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2017

Alphabet Inc.

(Exact name of registrant as specified in its charter)

The following table presents our revenues disaggregated by geography, based on the billing addresses of our customers (in millions):

	Twelve Months Ended December 31,		
	2015	2016	2017
United States	$ 34,810	$ 42,781	$ 52,449
EMEA[1]	26,368	30,304	36,046
APAC[1]	9,887	12,559	16,235
Other Americas[1]	3,924	4,628	6,125
Total revenues[2]	$ 74,989	$ 90,272	$ 110,855

(1) Regions represent Europe, the Middle East, and Africa (EMEA); Asia-Pacific (APAC); and Canada and Latin America (Other Americas).
(2) Revenues include hedging gains (losses) for the the years ended December 31, 2015, 2016, and 2017.

The following table presents our long-lived assets by geographic area (in millions):

	As of December 31, 2016	As of December 31, 2017
Long-lived assets:		
United States	$ 47,383	$ 55,113
International	14,706	17,874
Total long-lived assets	$ 62,089	$ 72,987

Example 3. Oracle Corporation

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended May 31, 2017

Oracle Corporation

(Exact name of registrant as specified in its charter)

Geographic Information

Disclosed in the table below is geographic information for each country that comprised greater than three percent of our total revenues for any of fiscal 2017, 2016 or 2015.

	As of and for the Year Ended May 31,					
	2017		2016		2015	
(in millions)	Revenues	Long-Lived Assets [1]	Revenues	Long-Lived Assets [1]	Revenues	Long-Lived Assets [1]
United States	$ 17,770	$ 4,680	$ 17,264	$ 3,646	$ 17,325	$ 3,341
United Kingdom	1,999	402	2,349	334	2,388	309
Japan	1,618	380	1,465	375	1,433	338
Germany	1,417	116	1,438	40	1,466	33
Canada	1,102	60	1,096	44	1,286	58
Other countries	13,822	1,090	13,435	989	14,328	1,040
Total	$ 37,728	$ 6,728	$ 37,047	$ 5,428	$ 38,226	$ 5,119

[1] Long-lived assets exclude goodwill, intangible assets, equity investments and deferred taxes, which are not allocated to specific geographic locations as it is impracticable to do so.

TABLES

Table 3.1. Summary Statistics

Panel A. 13F – Institutional Ownership

	N	Mean	Median	SD	Min	Max
Country disclosure	21,621	0.62	1.00	0.49	0.00	1.00
Country disclosure (excl. Canada)	21,621	0.54	1.00	0.50	0.00	1.00
Aggregated disclosure	21,621	0.15	0.00	0.36	0.00	1.00
Index IO	21,621	0.09	0.08	0.07	0.00	0.22
Hedge IO	21,621	0.07	0.04	0.08	0.00	0.32
Ln (market value)	21,621	6.99	6.95	1.97	2.29	11.40
Leverage	21,621	0.52	0.51	0.25	0.08	1.40
Market-to-book	21,621	2.89	2.13	4.71	-18.10	29.34
Domestic pretax income	21,621	0.01	0.00	0.09	-0.43	0.25
Foreign pretax income	21,621	0.01	0.00	0.04	-0.10	0.14
Intangibles	21,621	0.18	0.12	0.19	0.00	0.75
Multinational	21,621	0.59	1.00	0.49	0.00	1.00
Turnover	21,621	0.16	0.12	0.15	0.00	0.79
Analysts following	21,621	8.98	7.00	7.44	1.00	33.00
Forecast accuracy	21,621	6.63	6.00	4.57	1.00	18.00
Forecast diversity	21,621	6.32	5.00	4.41	1.00	18.00
Discretionary smoothing	21,621	6.22	5.50	3.48	1.00	15.50
Big 5 auditor	21,621	0.86	1.00	0.35	0.00	1.00

Panel B. S12 – Mutual Fund Ownership

	N	Mean	Median	SD	Min	Max
Country disclosure	22,352	0.61	1.00	0.49	0.00	1.00
Country disclosure (excl. Canada)	22,352	0.52	1.00	0.50	0.00	1.00
Aggregated disclosure	22,352	0.15	0.00	0.36	0.00	1.00
Index IO	22,352	0.04	0.03	0.04	0.00	0.14
Hedge IO	22,352	0.07	0.04	0.08	0.00	0.32
Ln (market value)	22,352	6.97	6.92	1.96	2.52	11.38
Leverage	22,352	0.52	0.51	0.25	0.08	1.34
Market-to-book	22,352	2.91	2.14	4.60	-16.76	27.57
Domestic pretax income	22,352	0.01	0.00	0.08	-0.41	0.25
Foreign pretax income	22,352	0.01	0.00	0.03	-0.09	0.14
Intangibles	22,352	0.18	0.12	0.19	0.00	0.74
Multinational	22,352	0.60	1.00	0.49	0.00	1.00
Turnover	22,352	0.16	0.12	0.15	0.00	0.79
Analysts following	22,352	9.06	7.00	7.38	1.00	32.00
Forecast accuracy	22,352	6.75	6.00	4.76	1.00	19.00
Forecast diversity	22,352	6.58	5.00	4.71	1.00	19.00
Discretionary smoothing	22,352	6.35	5.50	3.73	1.00	16.50
Big 5 auditor	22,352	0.87	1.00	0.33	0.00	1.00

Table 3.2. Pairwise Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	Country disclosure	1.00															
(2)	Index IO	-0.01	1.00														
		(0.34)															
(3)	Hedge IO	**-0.04**	**0.14**	1.00													
		(0.00)	(0.00)														
(4)	Ln (market value)	**0.16**	**0.36**	**-0.12**	1.00												
		(0.00)	(0.00)	(0.00)													
(5)	Leverage	**-0.05**	**0.06**	**0.02**	**0.08**	1.00											
		(0.00)	(0.00)	(0.00)	(0.00)												
(6)	Market-to-book	0.01	**0.04**	**0.02**	**0.16**	**-0.06**	1.00										
		(0.22)	(0.00)	(0.00)	(0.00)	(0.00)											
(7)	Domestic pretax inc.	**0.05**	**0.13**	**-0.10**	**0.26**	**-0.07**	**0.07**	1.00									
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)										
(8)	Foreign pretax inc.	**0.23**	**0.16**	**-0.05**	**0.25**	**-0.05**	**0.06**	**0.19**	1.00								
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)									
(9)	Intangibles	**0.10**	**0.12**	**0.07**	**0.12**	**0.02**	0.01	**0.07**	**0.09**	1.00							
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.20)	(0.00)	(0.00)								
(10)	Multinational	**0.47**	**0.19**	**0.03**	**0.21**	**-0.05**	**0.04**	**0.11**	**0.34**	**0.26**	1.00						
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)							
(11)	Turnover	**-0.02**	**0.38**	**0.29**	**0.11**	**-0.03**	**0.08**	0.01	**0.03**	0.01	**0.11**	1.00					
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)	(0.18)	(0.00)						
(12)	Analysts following	**0.12**	**0.37**	**0.02**	**0.61**	**0.03**	**0.12**	**0.14**	**0.21**	**0.13**	**0.25**	**0.36**	1.00				
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)					
(13)	Forecast accuracy	**0.11**	**0.12**	**-0.11**	**0.16**	**0.04**	**-0.03**	**0.07**	**0.10**	-0.00	**0.10**	-0.01	**0.06**	1.00			
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.99)	(0.00)	(0.01)	(0.00)				
(14)	Forecast diversity	**0.09**	-0.00	**-0.13**	**0.09**	**0.02**	-0.02	-0.01	**0.02**	**-0.05**	**0.07**	**-0.05**	**0.04**	**0.37**	1.00		
		(0.00)	(0.77)	(0.00)	(0.00)	(0.00)	(0.01)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
(15)	Discretionary smoot.	**0.11**	**0.07**	**-0.13**	**0.14**	**-0.07**	**-0.08**	**0.10**	**0.13**	**-0.04**	**0.10**	**-0.09**	0.01	**0.38**	**0.49**	1.00	
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.12)	(0.00)	(0.00)		
(16)	Big 5 auditor	**0.06**	**0.18**	**-0.02**	**0.37**	**0.09**	**0.02**	**0.07**	**0.06**	**0.06**	**0.12**	**0.09**	**0.25**	**0.06**	**0.07**	**0.04**	1.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

Table 3.3. DID Probit: Indexed Ownership and Geographic Segment Disclosure

Pre-treatment descriptive statistics (Panel A) and difference-in-differences (DID) regressions of geographic segment disclosure around the elimination of investing limits in iShares ETFs in 2003 (Panel B). The sample includes US publicly listed firms and covers the years 1998-2016. Treated is an indicator variable that equals one if a stock is held by an iShares exchange traded fund; and zero if it is held by an exchange traded fund other than iShares (i.e. Control). Post is an indicator variable that equals one in 2003 and after; and zero otherwise. The analysis is led on a two-year event window before and after 2003. Treated firms are matched to the nearest neighbour control firms without replacement using propensity scores based on multiple (two-year) lagged covariates. Table A.3.1 in the Appendix reports variable definitions. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Pre-Treatment Means

	Treated	Control	Difference	T-test
Index IO	0.0214	0.0255	**-0.0041*** **	-2.6482
Hedge IO	0.0309	0.0259	0.0051	1.2319
Ln (market value)	7.6324	7.4915	0.1409	0.8243
Leverage	0.5319	0.4834	**0.0484***	1.6963
Market-to-book	3.3688	3.6110	-0.2422	-0.4087
Domestic pre-tax income	0.0000	0.0052	-0.0052	-0.6503
Foreign pre-tax income	0.0017	0.0136	**-0.0119*** **	-3.7333
Intangibles	0.1485	0.1363	0.0122	0.6204
Multinational	0.1963	0.5092	**-0.3129*** **	-6.2370
Turnover	0.1953	0.1437	**0.0515*** **	2.9954
Analysts following	13.2147	9.2914	**3.9233*** **	5.0029
Forecast accuracy	5.3926	7.0123	**-1.6196*** **	-3.0849
Forecast diversity	8.6380	9.7244	**-1.0863***	-1.8401
Discretionary smoothing	7.1046	8.7480	**-1.6434*** **	-2.9268
Big 5 auditor	0.9816	0.9755	0.0061	0.3810

Panel B. Difference-in-differences regressions

	Year 2003 included		Year 2003 excluded	
VARIABLES	(1) Probit: Country disclosure	(2) Probit: Country disclosure (excl. Canada)	(3) Probit: Country disclosure	(4) Probit: Country disclosure (excl. Canada)
Treated × Post	**-0.3352*** **	**-0.2250** **	**-0.3777** **	**-0.2521** **
	(0.1229)	(0.1074)	(0.1475)	(0.1277)
Treated	0.0687	0.0180	0.0702	0.0252
	(0.2183)	(0.2093)	(0.2200)	(0.2102)
Post	-0.2029	-0.0579	-0.1383	-0.0071
	(0.1836)	(0.1644)	(0.1892)	(0.1671)
Hedge IO	4.7020***	2.8982*	4.2844***	2.3921*
	(1.4862)	(1.5139)	(1.4602)	(1.4405)
Ln (market value)	0.2393**	0.1933**	0.2363**	0.1791**
	(0.0963)	(0.0800)	(0.0947)	(0.0768)
Leverage	0.5562	-0.3312	0.6150	-0.2986
	(0.4098)	(0.4086)	(0.4011)	(0.4059)
Market-to-book	-0.0183	-0.0026	-0.0207	-0.0010
	(0.0123)	(0.0107)	(0.0128)	(0.0111)
Domestic pretax income	0.9149	-0.1703	1.1126	0.1224
	(1.0654)	(0.9938)	(1.0574)	(0.9865)
Foreign pretax income	4.9042	5.3097**	4.6983	5.2452**
	(3.0286)	(2.5215)	(2.9666)	(2.4810)
Intangibles	-1.6663***	-1.4558***	-1.6263***	-1.3745**
	(0.5531)	(0.5463)	(0.5519)	(0.5455)
Multinational	0.8226***	0.6874***	0.8493***	0.7176***
	(0.1997)	(0.1932)	(0.2045)	(0.1971)
Turnover	-1.4571***	-1.2256**	-1.2956**	-1.0611*
	(0.5403)	(0.5630)	(0.5425)	(0.5664)
Analysts following	0.0185	0.0042	0.0152	0.0034
	(0.0157)	(0.0155)	(0.0156)	(0.0154)
Forecast accuracy	0.0102	0.0129*	-0.0011	0.0054
	(0.0090)	(0.0078)	(0.0098)	(0.0085)
Forecast diversity	0.0041	0.0140	0.0061	0.0151
	(0.0134)	(0.0131)	(0.0135)	(0.0130)
Discretionary smoothing	0.0312*	0.0191	0.0398**	0.0250
	(0.0178)	(0.0168)	(0.0173)	(0.0169)
Big 5 auditor	-0.1254	0.1369	-0.1358	0.0679
	(0.3651)	(0.3283)	(0.3486)	(0.3324)
Observations	1,495	1,495	1,243	1,243
Pseudo-R^2	0.34	0.29	0.35	0.30
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Margins: Treated × Post	**-0.1241*** **	**-0.0780** **	**-0.1369** **	**-0.0883** **

Table 3.4. DID Probit: The Role of Tax Haven Operations

Difference-in-differences regressions of geographic segment disclosure around the elimination of investing limits in iShares ETFs in 2003. The sample includes US publicly listed firms and covers the years 1998-2016. Treated is an indicator variable that equals one if a stock is held by an iShares exchange traded fund; and zero if it is held by an exchange traded fund other than iShares (i.e. Control). Post is an indicator variable that equals one in 2003 and after; and zero otherwise. Haven countries is an indicator equal to one if the majority of the countries in which a firm leads its operations are tax havens; and zero otherwise (Panel A). Haven subsidiaries is an indicator equal to one if the majority of foreign subsidiaries are domiciled in tax haven countries; and zero otherwise (Panel B). The analysis is led on a two-year event window before and after 2003. Treated firms are matched to the nearest neighbour control firms without replacement using propensity scores based on multiple (two-year) lagged covariates. Table A.3.1 in the Appendix reports variable definitions. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Tax haven countries

	Year 2003 included		Year 2003 excluded	
VARIABLES	(1) Probit: Country disclosure	(2) Probit: Country disclosure (excl. Canada)	(3) Probit: Country disclosure	(4) Probit: Country disclosure (excl. Canada)
Treated × Post × Haven countries	**4.9455*** **	**6.3503*** **	**5.3301*** **	**6.6321*** **
	(1.0495)	(1.0721)	(1.1041)	(1.1015)
Treated × Post	-0.5988***	-0.6217***	-0.7216***	-0.7552***
	(0.1712)	(0.1636)	(0.2102)	(0.1903)
Treated × Haven countries	-4.7764***	-4.5927***	-5.0536***	-4.9870***
	(0.9645)	(0.9409)	(1.0139)	(0.9708)
Treated	0.1463	0.2422	0.1891	0.2985
	(0.2871)	(0.2692)	(0.2893)	(0.2703)
Post × Haven countries	-3.6570***	-4.7738***	-3.9085***	-4.9596***
	(0.9673)	(0.9021)	(1.0030)	(0.9076)
Post	-0.2682	-0.0358	-0.2176	0.0333
	(0.2484)	(0.2178)	(0.2658)	(0.2259)
Haven countries	3.0953***	3.0557***	3.2199***	3.2818***
	(0.7750)	(0.6742)	(0.8040)	(0.6952)
Hedge IO	6.4600***	3.6129**	6.4475***	3.4109*
	(1.9174)	(1.8378)	(1.9548)	(1.8672)
Ln (market value)	0.5502***	0.3781***	0.5893***	0.3663***
	(0.1158)	(0.1094)	(0.1147)	(0.1090)
Leverage	-0.1133	-1.2506**	-0.1437	-1.2468**
	(0.5050)	(0.4902)	(0.4974)	(0.5000)
Market-to-book	-0.0517**	-0.0294	-0.0642***	-0.0335*
	(0.0203)	(0.0182)	(0.0209)	(0.0196)
Domestic pretax income	-0.5212	-0.8611	-0.6310	-0.5256
	(1.1941)	(1.0663)	(1.1798)	(1.0687)
Foreign pretax income	5.7462*	6.7131**	6.5417*	7.2139***
	(3.3496)	(2.8178)	(3.3756)	(2.7851)
Intangibles	-2.5349***	-1.7452***	-2.5451***	-1.6708***
	(0.6658)	(0.6346)	(0.6742)	(0.6326)
Multinational	0.6983***	0.5966**	0.7675***	0.6874***
	(0.2346)	(0.2482)	(0.2439)	(0.2617)
Turnover	-1.7311**	-1.5306**	-1.5736**	-1.4165**
	(0.7175)	(0.6772)	(0.7102)	(0.6724)
Analysts following	-0.0203	-0.0333*	-0.0293*	-0.0355*
	(0.0172)	(0.0181)	(0.0170)	(0.0183)
Forecast accuracy	0.0019	0.0103	-0.0056	0.0061
	(0.0109)	(0.0098)	(0.0125)	(0.0110)
Forecast diversity	-0.0035	0.0142	-0.0002	0.0147
	(0.0184)	(0.0167)	(0.0187)	(0.0169)
Discretionary smoothing	0.0265	0.0214	0.0334	0.0301
	(0.0234)	(0.0216)	(0.0236)	(0.0217)
Big 5 auditor	-0.3592	0.1723	-0.3690	0.1090
	(0.4959)	(0.4775)	(0.4844)	(0.4779)
Observations	938	938	783	783
Pseudo-R^2	0.33	0.29	0.35	0.30
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Margins: Treated × Post × Haven countries	**1.5570*** **	**2.4759*** **	**1.6247*** **	**2.5735*** **

Panel B. Tax haven subsidiaries

	Year 2003 included		Year 2003 excluded	
VARIABLES	(1) Probit: Country disclosure	(2) Probit: Country disclosure (excl. Canada)	(3) Probit: Country disclosure	(4) Probit: Country disclosure (excl. Canada)
Treated × Post × Haven subsidiaries	**5.8215*** **	**1.5021** **	**6.2225*** **	**1.7781***
	(0.7984)	(0.7367)	(0.9099)	(0.9337)
Treated × Post	-0.6294***	-0.6250***	-0.7619***	-0.7659***
	(0.1748)	(0.1676)	(0.2125)	(0.1958)
Treated × Haven subsidiaries	-5.5688***	-0.1999	-5.5375***	-0.2641
	(0.8980)	(1.0059)	(0.9123)	(1.0300)
Treated	0.1556	0.2195	0.1927	0.2762
	(0.2834)	(0.2637)	(0.2844)	(0.2650)
Post × Haven subsidiaries	-5.3179***	-1.0737**	-5.6849***	-1.4190**
	(0.6384)	(0.4342)	(0.6681)	(0.5913)
Post	-0.2854	-0.0717	-0.2170	0.0343
	(0.2497)	(0.2153)	(0.2633)	(0.2222)
Haven subsidiaries	5.3644***	0.2698	5.3803***	0.3203
	(0.4607)	(0.6526)	(0.4558)	(0.6546)
Hedge IO	6.7242***	3.9595**	6.7106***	3.6998*
	(1.9183)	(1.8693)	(1.9703)	(1.9103)
Ln (market value)	0.5428***	0.3755***	0.5850***	0.3644***
	(0.1141)	(0.1074)	(0.1134)	(0.1073)
Leverage	-0.0357	-1.2060**	-0.0643	-1.2035**
	(0.5046)	(0.4839)	(0.4952)	(0.4939)
Market-to-book	-0.0493**	-0.0282	-0.0613***	-0.0322*
	(0.0199)	(0.0177)	(0.0205)	(0.0190)
Domestic pretax income	-0.7228	-1.0948	-0.8612	-0.7794
	(1.1926)	(1.0609)	(1.1827)	(1.0663)
Foreign pretax income	6.0444*	7.0329**	6.9118**	7.5811***
	(3.3844)	(2.7699)	(3.4241)	(2.7503)
Intangibles	-2.5616***	-1.8516***	-2.5904***	-1.7823***
	(0.6665)	(0.6315)	(0.6777)	(0.6296)
Multinational	0.7201***	0.6321**	0.7877***	0.7235***
	(0.2351)	(0.2487)	(0.2443)	(0.2619)
Turnover	-1.6058**	-1.4511**	-1.4119**	-1.3135*
	(0.7207)	(0.6808)	(0.7108)	(0.6754)
Analysts following	-0.0222	-0.0352*	-0.0321*	-0.0373**
	(0.0170)	(0.0182)	(0.0167)	(0.0184)
Forecast accuracy	0.0019	0.0113	-0.0053	0.0075
	(0.0109)	(0.0096)	(0.0124)	(0.0107)
Forecast diversity	-0.0036	0.0124	0.0007	0.0144
	(0.0184)	(0.0169)	(0.0187)	(0.0170)
Discretionary smoothing	0.0265	0.0213	0.0327	0.0295
	(0.0230)	(0.0214)	(0.0230)	(0.0214)
Big 5 auditor	-0.3943	0.1517	-0.4060	0.0918
	(0.5021)	(0.4785)	(0.4896)	(0.4776)
Observations	938	938	783	783
Pseudo-R^2	0.33	0.28	0.35	0.29
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Margins: Treated × Post × Haven countries	**1.7951*** **	**0.5868** **	**1.8462*** **	**0.6913***

Table 3.5. IV Probit: Indexed Ownership and Geographic Segment Disclosure

Regressions of geographic segment disclosure on indexed ownership using longitudinal data on US non-financial and non-utility firms in the years 1998-2016. The dependent variable, Country disclosure, equals one if a firm reports the name of at least one foreign country in which it leads its operations and zero otherwise. Index IO represents the sum of the holdings by either 13F indexed institutions as flagged in Factset LionShares (Panel A) or S12 indexed mutual funds as reported in Thomson Reuters (Panel B) divided by the stock's market capitalization. IV regressions use Russell 2000, Rank adjusted and Russell 2000 × Rank adjusted as instrumental variables for indexed ownership over ±300 ranks from the threshold. Bandwidth controls include Band and Band × Russell 2000_{t-1}. Band indicates stocks that after the banding policy introduced by Russell in 2007 do not switch index despite a change in their market capitalization ranking and Russell 2000_{t-1} identifies stocks that Ire included in the index in the previous year. Table A.3.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Panel A. 13F - Indexed Institutional Ownership

VARIABLES	(1) Probit: Country disclosure	(2) First-stage: Index IO	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)
Index IO	**-2.0680*** **		**-13.2758*** **	**-15.8126*** **
	(0.5429)		(4.7071)	(4.4062)
Hedge IO	-0.3873	-0.0275	-1.6212**	-1.3562**
	(0.3392)	(0.0196)	(0.7037)	(0.6707)
Ln (market value)	0.1275***	0.0038	-0.0667	-0.0023
	(0.0233)	(0.0024)	(0.0909)	(0.0831)
Leverage	0.0474	0.0006	0.1397	-0.1521
	(0.1233)	(0.0067)	(0.2875)	(0.2547)
Market-to-book	-0.0057	-0.0002	-0.0030	-0.0008
	(0.0042)	(0.0002)	(0.0098)	(0.0085)
Domestic pretax income	-0.1616	0.0119	0.1625	-0.1041
	(0.2920)	(0.0156)	(0.6395)	(0.5913)
Foreign pretax income	3.1517***	0.0334	5.0905***	6.2944***
	(0.7736)	(0.0426)	(1.6995)	(1.5099)
Intangibles	-0.5462***	0.0162*	-0.0834	0.1634
	(0.1599)	(0.0088)	(0.3410)	(0.3124)
Multinational	1.0046***	-0.0047	0.7429***	0.4643***
	(0.0632)	(0.0039)	(0.2026)	(0.1747)
Turnover	-0.4325**	0.0556***	1.3844***	1.5435***
	(0.1917)	(0.0105)	(0.3994)	(0.3712)
Analysts following	-0.0087	0.0001	-0.0299***	-0.0329***
	(0.0056)	(0.0003)	(0.0100)	(0.0099)
Forecast accuracy	0.0117***	0.0005***	0.0183***	0.0161***
	(0.0027)	(0.0002)	(0.0064)	(0.0062)
Forecast diversity	0.0047	0.0001	0.0061	0.0108
	(0.0033)	(0.0003)	(0.0093)	(0.0094)
Discretionary smoothing	0.0087*	0.0014***	0.0341***	0.0203
	(0.0052)	(0.0003)	(0.0128)	(0.0130)
Big 5 auditor	-0.0533	0.0195**	0.6075*	0.6435**
	(0.0820)	(0.0094)	(0.3522)	(0.3273)
Russell 2000		**0.0046** **		
		(0.0022)		
Rank adjusted		0.0000		
		(0.0000)		
Russell 2000×Rank adjusted		**0.0000*** **		
		(0.0000)		
Observations	17,996	2,693	2,693	2,693
Pseudo-R^2	0.22	0.54	0.31	0.25
First-stage F-statistics		17.80***		
Bandwidth	ALL	300	300	300
Banding controls	NO	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Margins: Index IO	**-0.7479*** **		**-5.8889*** **	**-7.7076*** **

Panel B. S12 – Indexed Mutual Fund Ownership

VARIABLES	(2) Probit: Country disclosure	(3) First-stage: Index IO	(4) Second-stage: Country disclosure	(5) Second-stage: Country disclosure (excl. Canada)
Index IO	**-3.0509*** **		**-21.6177*** **	**-25.5968*** **
	(0.9048)		(7.7193)	(7.0093)
Hedge IO	-0.2189	-0.0205*	-1.6560**	-1.4767**
	(0.3413)	(0.0108)	(0.7013)	(0.6690)
Ln (market value)	0.1472***	-0.0014	-0.2082**	-0.1498*
	(0.0230)	(0.0013)	(0.0883)	(0.0864)
Leverage	0.0313	-0.0038	0.0304	-0.2593
	(0.1262)	(0.0037)	(0.3122)	(0.2704)
Market-to-book	-0.0058	-0.0001	-0.0044	-0.0007
	(0.0041)	(0.0001)	(0.0106)	(0.0092)
Domestic pretax income	-0.2001	0.0119	0.3107	-0.0186
	(0.3032)	(0.0085)	(0.6669)	(0.6131)
Foreign pretax income	2.9867***	0.0179	5.6732***	6.9678***
	(0.7815)	(0.0246)	(1.7359)	(1.5251)
Intangibles	-0.5646***	0.0121***	-0.0271	0.1969
	(0.1579)	(0.0044)	(0.3388)	(0.3113)
Multinational	1.0151***	-0.0027	0.7948***	0.4864***
	(0.0624)	(0.0019)	(0.1839)	(0.1652)
Turnover	-0.4131**	0.0263***	1.1425***	1.2926***
	(0.1875)	(0.0055)	(0.3830)	(0.3586)
Analysts following	-0.0113**	0.0001	-0.0263***	-0.0306***
	(0.0054)	(0.0002)	(0.0100)	(0.0099)
Forecast accuracy	0.0111***	0.0002***	0.0191***	0.0137**
	(0.0024)	(0.0001)	(0.0061)	(0.0058)
Forecast diversity	0.0024	0.0002	0.0061	0.0158*
	(0.0032)	(0.0001)	(0.0097)	(0.0091)
Discretionary smoothing	0.0064	0.0006***	0.0291**	0.0138
	(0.0050)	(0.0001)	(0.0121)	(0.0114)
Big 5 auditor	-0.0711	0.0071	0.5113	0.5301*
	(0.0846)	(0.0054)	(0.3515)	(0.3216)
Russell 2000		**0.0032*** **		
		(0.0011)		
Rank adjusted		**0.0000*** **		
		(0.0000)		
Russell 2000×Rank adjusted		**0.0000** **		
		(0.0000)		
Observations	18,395	2,843	2,843	2,843
Pseudo-R^2	0.23	0.72	0.29	0.24
First-stage F-statistics		26.43***		
Bandwidth	ALL	300	300	300
Banding controls	NO	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Margins: Index IO	**-1.1146*** **		**-15.2772*** **	**-19.5128*** **

Table 3.6. IV Probit: The Role of Tax Haven Operations

Regressions of geographic segment disclosure on indexed ownership using longitudinal data on US non-financial and non-utility firms in the years 1998-2016. Index IO represents the sum of the holdings by either 13F indexed institutions as flagged in Factset LionShares or S12 indexed mutual funds as reported in Thomson Reuters divided by the stock's market capitalization. Russell 2000, Rank adjusted and Russell 2000 × Rank adjusted are instrumental variables for indexed ownership over ±300 ranks from the threshold. Haven countries is an indicator equal to one if the majority of the countries in which a firm leads its operations are tax havens; and zero otherwise (Panel A). Haven subsidiaries is an indicator equal to one if the majority of foreign subsidiaries are domiciled in tax haven countries; and zero otherwise (Panel B). Table A.3.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Panel A. 13F – Indexed Institutional Ownership

VARIABLES	(1) Second-stage: Country disclosure	(2) Second-stage: Country disclosure (excl. Canada)	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)
Index IO	**-14.0326****	**-17.3276*****	**-14.1436****	**-16.9531*****
	(6.0898)	(5.7784)	(6.0834)	(5.7787)
Haven countries	-1.2437*	-1.0206		
	(0.6814)	(0.6971)		
Index IO × Haven countries	**12.4698****	9.5749		
	(6.2590)	(6.1581)		
Haven subsidiaries			-1.0418	-0.4361
			(0.6682)	(0.6404)
Index IO × Haven subsidiaries			**11.6913****	6.5143
			(5.9173)	(5.5993)
Hedge IO	-1.1816*	-1.4359**	-1.1735*	-1.4460**
	(0.6511)	(0.6166)	(0.6540)	(0.6174)
Ln (market value)	0.1477	0.2599**	0.1493	0.2575**
	(0.1223)	(0.1062)	(0.1221)	(0.1060)
Leverage	0.0723	-0.2332	0.0804	-0.2267
	(0.1896)	(0.1877)	(0.1879)	(0.1851)
Market-to-book	-0.0064	-0.0135	-0.0062	-0.0132
	(0.0095)	(0.0086)	(0.0095)	(0.0086)
Domestic pretax income	-0.8722	-0.7268	-0.8665	-0.7224
	(0.5366)	(0.5280)	(0.5378)	(0.5293)
Foreign pretax income	4.5564***	6.0537***	4.5222***	6.0381***
	(1.2873)	(1.2314)	(1.2886)	(1.2299)
Intangibles	-0.8110***	-0.4085**	-0.7942***	-0.3931**
	(0.1982)	(0.1914)	(0.1985)	(0.1916)
Multinational	0.6208***	0.3176***	0.6203***	0.3294***
	(0.1194)	(0.1206)	(0.1223)	(0.1217)
Turnover	1.4329***	1.7095***	1.4349***	1.6875***
	(0.4249)	(0.4006)	(0.4233)	(0.3991)
Analysts following	-0.0464***	-0.0532***	-0.0463***	-0.0531***
	(0.0086)	(0.0085)	(0.0085)	(0.0084)
Forecast accuracy	0.0039	0.0099	0.0039	0.0096
	(0.0091)	(0.0081)	(0.0090)	(0.0081)
Forecast diversity	-0.0140	-0.0073	-0.0144	-0.0074
	(0.0104)	(0.0101)	(0.0104)	(0.0100)
Discretionary smoothing	0.0365**	0.0090	0.0373***	0.0098
	(0.0142)	(0.0128)	(0.0142)	(0.0128)
Big 5 auditor	0.6838***	0.5514***	0.6892***	0.5592***
	(0.2047)	(0.1835)	(0.2041)	(0.1825)
Observations	1,720	1,720	1,720	1,720
Pseudo-R^2	0.20	0.16	0.21	0.16
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel B. S12 – Indexed Mutual Fund Ownership

VARIABLES	(1) Second-stage: Country disclosure	(2) Second-stage: Country disclosure (excl. Canada)	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)
Index IO	**-13.5346***	**-16.9505****	**-14.0794***	**-16.6821****
	(7.5813)	(6.9132)	(7.5523)	(6.8668)
Haven countries	-0.4372	-0.4512		
	(0.4168)	(0.4110)		
Index IO × Haven countries	**14.8968***	9.4509		
	(8.7482)	(7.7549)		
Haven subsidiaries			-0.5648	-0.2649
			(0.4005)	(0.3651)
Index IO × Haven subsidiaries			**18.0703****	10.0275
			(7.9156)	(6.8849)
Hedge IO	-1.2831**	-1.4659**	-1.2613**	-1.4401**
	(0.6285)	(0.5925)	(0.6314)	(0.5957)
Ln (market value)	-0.0471	0.0507	-0.0435	0.0533
	(0.1176)	(0.1073)	(0.1176)	(0.1075)
Leverage	-0.0328	-0.2850	-0.0276	-0.2868
	(0.1811)	(0.1786)	(0.1804)	(0.1768)
Market-to-book	-0.0091	-0.0127	-0.0091	-0.0126
	(0.0091)	(0.0081)	(0.0091)	(0.0081)
Domestic pretax income	-0.9890*	-0.9409*	-0.9971**	-0.9494*
	(0.5058)	(0.4904)	(0.5072)	(0.4917)
Foreign pretax income	5.4072***	6.8116***	5.3370***	6.8066***
	(1.2589)	(1.1876)	(1.2648)	(1.1898)
Intangibles	-0.8046***	-0.4604**	-0.7878***	-0.4432**
	(0.1865)	(0.1822)	(0.1873)	(0.1824)
Multinational	0.6251***	0.2853**	0.6200***	0.2967***
	(0.1156)	(0.1145)	(0.1177)	(0.1144)
Turnover	0.9081**	1.1501***	0.9034**	1.1241***
	(0.3571)	(0.3265)	(0.3585)	(0.3271)
Analysts following	-0.0327***	-0.0386***	-0.0324***	-0.0384***
	(0.0078)	(0.0078)	(0.0078)	(0.0077)
Forecast accuracy	0.0029	0.0038	0.0030	0.0037
	(0.0081)	(0.0070)	(0.0081)	(0.0070)
Forecast diversity	-0.0164*	-0.0032	-0.0169*	-0.0034
	(0.0098)	(0.0095)	(0.0099)	(0.0095)
Discretionary smoothing	0.0243*	-0.0019	0.0246*	-0.0010
	(0.0127)	(0.0111)	(0.0127)	(0.0111)
Big 5 auditor	0.5646***	0.4430**	0.5792***	0.4504**
	(0.1989)	(0.1785)	(0.1984)	(0.1788)
Observations	1,839	1,839	1,839	1,839
Pseudo-R^2	0.19	0.15	0.19	0.15
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Table 3.7. Indexed Ownership, Corporate Governance and Geographic Segment Disclosure

Regressions of geographic segment disclosure on indexed ownership using longitudinal data on US non-financial and non-utility firms in the years 1998-2016. Index IO represents the sum of the holdings by either 13F indexed institutions as flagged in Factset LionShares or S12 indexed mutual funds as reported in Thomson Reuters divided by the stock's market capitalization. Russell 2000, Rank adjusted and Russell 2000 × Rank adjusted are instrumental variables for indexed ownership over ±300 ranks from the threshold. Table A.3.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

VARIABLES	(1) Second-stage: Country disclosure	(2) Second-stage: Country disclosure (excl. Canada)	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)	(5) Second-stage: Country disclosure	(6) Second-stage: Country disclosure (excl. Canada)
Panel A. 13F – Indexed Institutional Ownership						
Index IO	**-19.8936*** **	**-24.8440*** **	**-20.2798*** **	**-27.5706*** **	**-22.8068*** **	**-27.9712*** **
	(5.4791)	(5.4744)	(5.5187)	(5.5969)	(8.3492)	(7.7056)
CEO-Chairman	-0.6255*	-0.3150				
	(0.3297)	(0.3280)				
Index IO × CEO-Chairman	**4.5885***	3.9237				
	(2.5496)	(2.4737)				
CEO-President			-0.6772*	-1.2355***		
			(0.4093)	(0.4063)		
Index IO × CEO-President			**5.1514***	**8.0766*** **		
			(3.0451)	(2.9842)		
E-index					-1.0114*	-1.2584**
					(0.5400)	(0.5219)
Index IO × E-index					**6.7448***	**8.0472*** **
					(3.6162)	(3.4181)
Observations	1,519	1,519	1,519	1,519	1,613	1,613
Pseudo-R^2	0.31	0.29	0.31	0.29	0.33	0.28
Controls	YES	YES	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel B. S12 – Indexed Mutual Fund Ownership						
Index IO	**-25.2481*** **	**-32.8544*** **	**-25.5785*** **	**-35.1229*** **	**-23.8991*** **	**-32.0047*** **
	(7.2980)	(7.0224)	(7.2861)	(6.9625)	(9.1155)	(8.7133)
CEO-Chairman	-0.1550	-0.0942				
	(0.1871)	(0.1894)				
Index IO × CEO-Chairman	2.4123	**4.5253***				
	(2.7993)	(2.7169)				
CEO-President			-0.1963	-0.6618***		
			(0.2173)	(0.2232)		
Index IO × CEO-President			2.5653	**6.8558** **		
			(3.1421)	(3.0632)		
E-index					-0.2058	-0.1780
					(0.3015)	(0.2954)
Index IO × E-index					3.6155	1.8145
					(3.9951)	(3.7218)
Observations	1,581	1,581	1,581	1,581	1,641	1,641
Pseudo-R^2	0.31	0.28	0.31	0.28	0.32	0.27
Controls	YES	YES	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Table 3.8. Indexed Ownership and Geographic Disclosure with Different Bandwidth

RDD regressions to identify the effect of indexed ownership on firms' geographic segment disclosure using longitudinal data on US non-financial and non-utility firms in the years 1998-2016. I estimate:

$$Y_{it} = \alpha + \beta \text{Russell } 2000_{it}^{n} + \sum_{n=1}^{N} \theta_n \text{Rank adjusted}_{it}^{n} + \sum_{n=1}^{N} \mu_n \text{Russell } 2000_{it} \times \text{Rank adjusted}_{it}^{n} + \varepsilon_{it},$$

where Y_{it} equals one if a firm reports the name of at least one foreign country in which it leads its operations and zero otherwise. Russell 2000_{it} is an indicator variable for firms in the Russell 2000 index and Rank adjusted$_{it}$ indicates, for each year, the distance from the Russell 1000/2000 cutoff centred at zero, with positive (negative) values associated with the Russell 2000 (1000) firms. β represents the bias-corrected RDD treatment coefficient estimated by fitting a local third-order polynomial estimate using a triangular kernel to the left and right hand sides of the Russell 1000/2000 threshold using the bias-correction methodology proposed by Calonico, Cattaneo, and Titiunik (2015). Table A.3.1 in the Appendix reports variable definitions. ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Panel A. 13F – Indexed Institutional Ownership

	(1) Country disclosure	(2) Country disclosure (excl. Canada)	(3) Country disclosure	(4) Country disclosure (excl. Canada)	(5) Country disclosure	(6) Country disclosure (excl. Canada)
Russell 2000	**-0.2292*** **	**-0.2594*** **	**-0.2606*** **	**-0.2940*** **	**-0.1599** **	**-0.1941*** **
	(0.0776)	(0.0794)	(0.0966)	(0.0933)	(0.0668)	(0.0645)
Order of polynomial (N)	3	3	3	3	3	3
Bandwidth	300	300	200	200	400	400
No. of observations	3,630	3,630	2,282	2,282	5,024	5,024

Panel B. S12 – Indexed Mutual Fund Ownership

	(1) Country disclosure	(2) Country disclosure (excl. Canada)	(3) Country disclosure	(4) Country disclosure (excl. Canada)	(5) Country disclosure	(6) Country disclosure (excl. Canada)
Russell 2000	**-0.2042***** (0.0749)	-0.0638 (0.0605)	**-0.2337**** (0.0931)	-0.0207 (0.0738)	**-0.1508**** (0.0646)	-0.0635 (0.0526)
Order of polynomial (N)	3	3	3	3	3	3
Bandwidth	300	300	200	200	400	400
No. of observations	3,814	3,814	2,403	2,403	5,246	5,246

Table 3.9. The Role of Tax Haven Operations with Different Bandwidth

Regressions of geographic segment disclosure on indexed ownership using longitudinal data on US non-financial and non-utility firms in the years 1998-2016. Index IO represents the sum of the holdings by either 13F indexed institutions as flagged in Factset LionShares or S12 indexed mutual funds as reported in Thomson Reuters divided by the stock's market capitalization. Russell 2000, Rank adjusted and Russell 2000 × Rank adjusted are instrumental variables for indexed ownership over ±200 and ±400 ranks from the threshold. Table A.3.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Panel A. Bandwidth: ±200

VARIABLES	(1) Second-stage: Country disclosure	(2) Second-stage: Country disclosure (excl. Canada)	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)
13F – Indexed Institutional Ownership				
Index IO	**-17.8916****	**-17.9733*****	**-18.4248****	**-18.0366*****
	(7.6195)	(6.9710)	(7.6278)	(6.9558)
Haven countries	-1.6723**	-0.6496		
	(0.7589)	(0.7811)		
Index IO × Haven countries	**16.2065****	7.4397		
	(6.8646)	(6.6500)		
Haven subsidiaries			-1.9083***	-0.5357
			(0.7080)	(0.7450)
Index IO × Haven subsidiaries			**18.7919*****	7.9582
			(6.5941)	(6.3209)
Observations	1,096	1,096	1,096	1,096
Controls	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
S12 – Indexed Mutual Fund Ownership				
Index IO	**-19.4290****	**-16.8788****	**-20.6483****	**-17.0253****
	(9.3076)	(8.4446)	(9.3054)	(8.4028)
Haven countries	-0.7295	-0.4749		
	(0.4894)	(0.4687)		
Index IO × Haven countries	**21.3452****	12.3234		
	(10.1582)	(8.4576)		
Haven subsidiaries			-1.1669**	-0.5255
			(0.4755)	(0.4568)
Index IO × Haven subsidiaries			**28.1390*****	**15.7718***
			(9.3064)	(8.1932)
Observations	1,184	1,184	1,184	1,184
Controls	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel B. Bandwidth: ±400

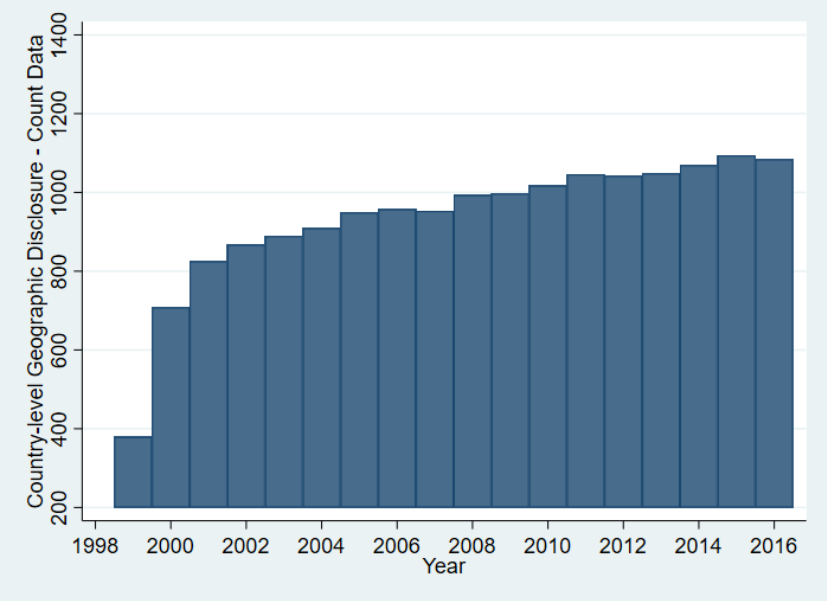
VARIABLES	(1) Second-stage: Country disclosure	(2) Second-stage: Country disclosure (excl. Canada)	(3) Second-stage: Country disclosure	(4) Second-stage: Country disclosure (excl. Canada)
13F – Indexed Institutional Ownership				
Index IO	-4.3482	**-11.8762****	-4.4374	**-11.6119****
	(5.4201)	(5.0194)	(5.4201)	(5.0227)
Haven countries	-1.1707*	-1.1714*		
	(0.6152)	(0.6210)		
Index IO × Haven countries	**12.2197****	**12.0058****		
	(5.7234)	(5.2788)		
Haven subsidiaries			-0.7589	-0.4658
			(0.6532)	(0.5900)
Index IO × Haven subsidiaries			9.6260	7.3974
			(5.9308)	(5.1310)
Observations	2,255	2,255	2,255	2,255
Controls	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
S12 – Indexed Mutual Fund Ownership				
Index IO	-6.8090	**-13.8460****	-7.1210	**-13.5938****
	(6.8479)	(6.0325)	(6.8332)	(6.0130)
Haven countries	-0.3844	-0.4097		
	(0.3555)	(0.3492)		
Index IO × Haven countries	**14.9223***	**11.9538***		
	(7.7747)	(6.2242)		
Haven subsidiaries			-0.1960	-0.0010
			(0.3727)	(0.3239)
Index IO × Haven subsidiaries			12.1998	7.2448
			(7.7102)	(6.1085)
Observations	2,413	2,413	2,413	2,413
Controls	YES	YES	YES	YES
Banding controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

FIGURES

Figure 3.1. Country-level Geographic Disclosure over Time

Panel A shows the number of firms per year reporting their operation at country-level disclosure. Panel B shows the percentage of firms reporting their operation at country-level relative to the total number of firms adopting geographic segment disclosure. Both graphs are plotted over time.

Panel A. Country-level Disclosure Firms: Count Data per Year



Panel B. Ratio Country-level Disclosure to Total Geographic Disclosure Firms

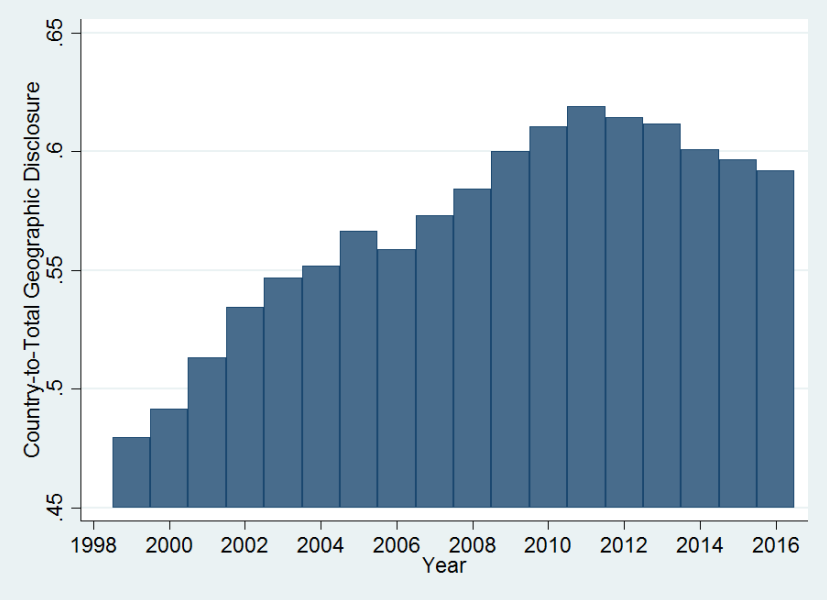
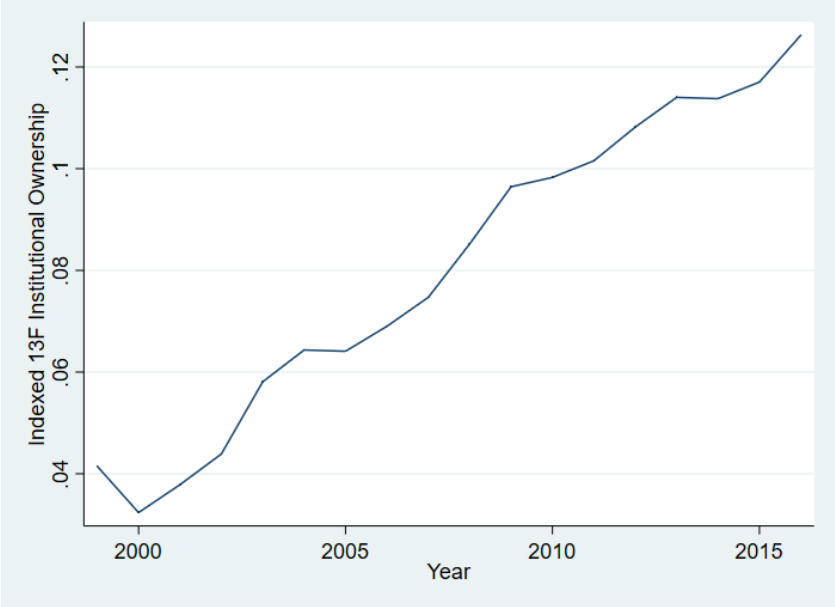


Figure 3.2. Indexed Ownership over Time

Panel A shows the time-trend of indexed 13F institutional ownership. Panel B shows the time-trend of indexed S12 mutual fund ownership. In both graphs, values are year-averages.

Panel A. 13F – Indexed Institutional Ownership



Panel B. S12 – Indexed Mutual Fund Ownership

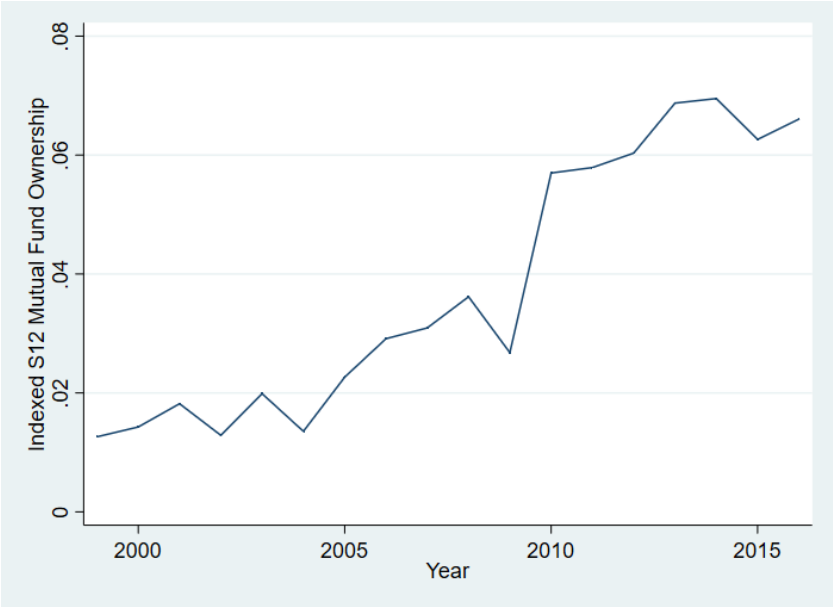


Figure 3.3. ETF Ownership around the Elimination of iShares ETFs' Investing Limits

Annual-average iShares ETF ownership (green-top line) and other ETF ownership (orange-bottom line) over time. The sample only includes treated and control firms in the period of two years before and after 2003.

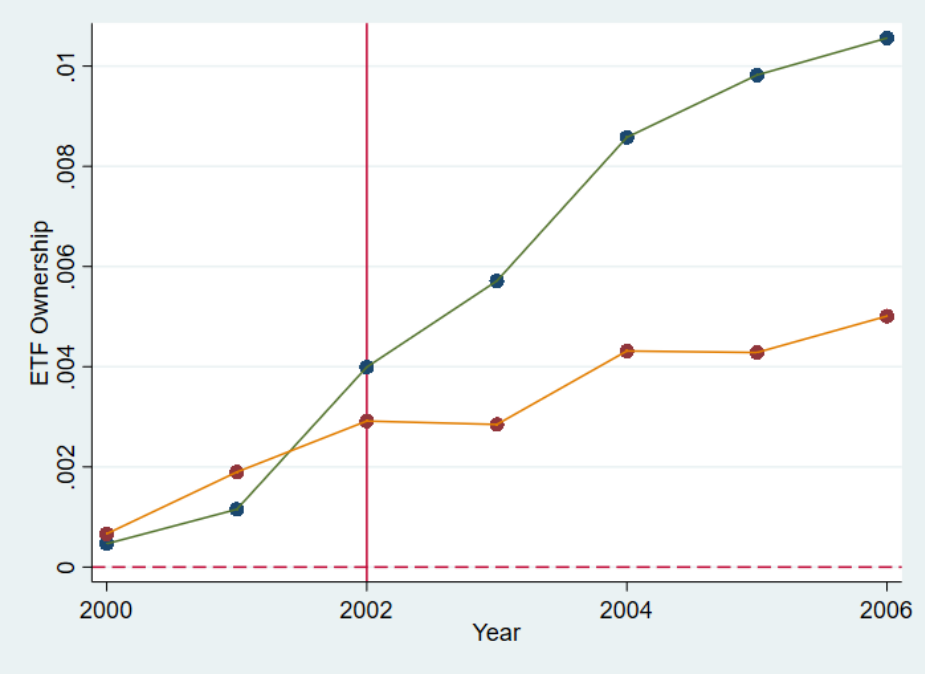
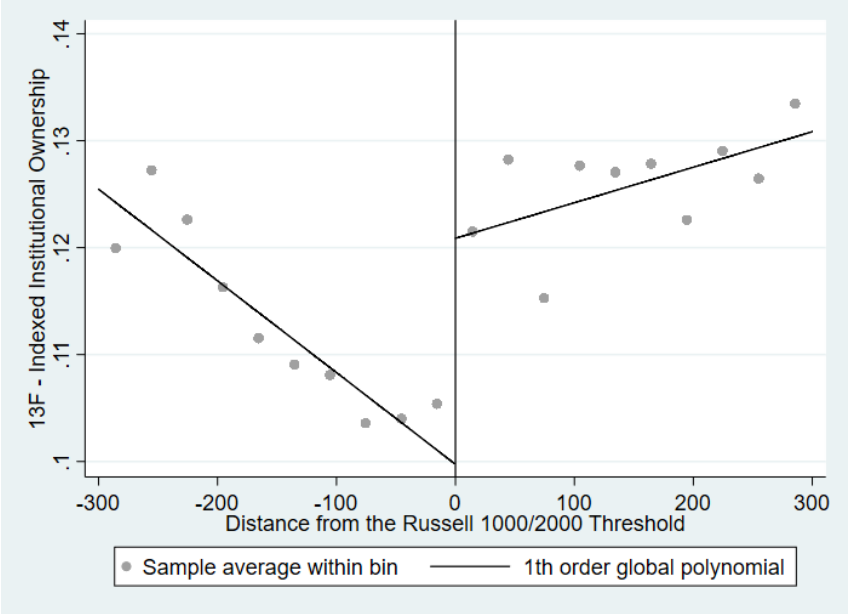


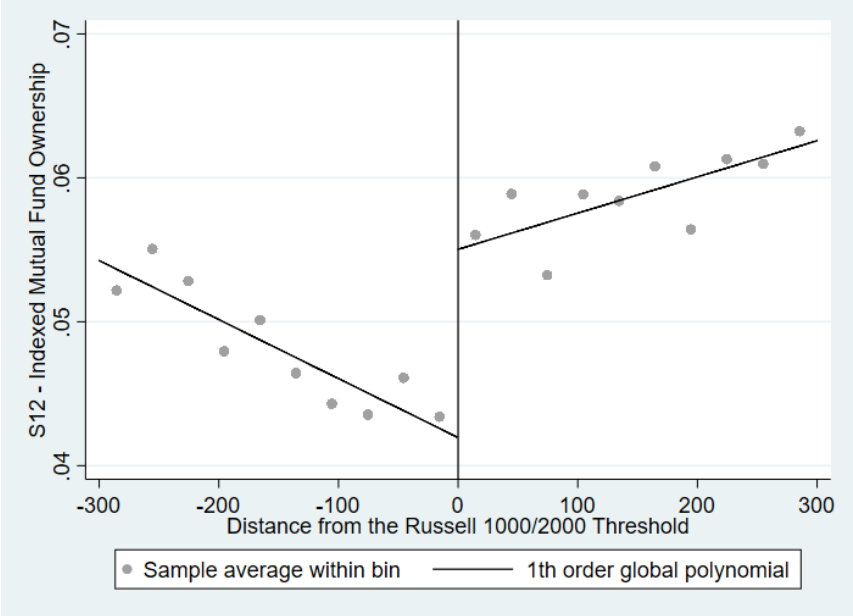
Figure 3.4. Indexed Ownership around the Russell 1000/2000 Cut-Off Point

Indexed ownership around the Russell 1000/2000 reconstitution threshold for the years 1998-2016. The x-axis represents the distance from the Russell 1000/2000 threshold using end-of-May's market capitalization rankings adjusted for actual inclusions (and exclusion) of stocks at the end of June (reconstitution date) and restricted to the bandwidth of the ±300 stocks around the threshold. Each dot in the figure represents the local sample mean using 10 non-overlapping evenly-spaced bins on each side of the cutoff following the approach illustrated by Calonico et al. (2015).

Panel A. 13F – Indexed Institutional Ownership



Panel B. S12 – Indexed Mutual Funds Ownership



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Chapter 4

Tax avoidance and labour investments

4.1 Introduction and motivation

How does tax avoidance affect firms' labour investments? The importance of this question stems from the extensive use of tax incentives and tax breaks by policy-makers to stimulate growth and employment[30] and by the specific claims made by firms engaging in tax avoidance about their role in creating jobs and fostering local economic activity[31]. Using a sample of 3,062 U.S. firms over the years 1992-2017, I examine the effect of corporate tax avoidance, which encompasses statutory tax rates, incentives, complexities and enforcements of tax systems and firms' tax planning preferences, on firms' hiring policies.

Labour is an important factor of production which requires significant investments by firms[32]. Yet, there is substantial variation in net hiring across U.S. companies. Part of this variation can be anticipated by changes in firms' underlying economic fundamentals (such as sales growth, profitability, liquidity and financial constraints) and industry-level employment rates and is therefore expected. In chapter 4, I investigate whether abnormal variations in labour investments relative to expected levels can be explained by firms' low cash effective tax rates (Low Cash ETR), my proxy for corporate tax avoidance.

From a theoretical standpoint, risks and uncertainties associated with tax avoidance can generate an important friction in firms' investment opportunities (or real options)

[30] For example, Mattera,Cafcas, McIlvaine, Seifter, and Tarczynska (2011) calculates that the 238 most significant state subsidy programs in force in the U.S. in 2011 (which include job creation income tax credits, cash grants, low cost forgivable loans, enterprise zones, reimbursement for worker training expenses and other types of company-specific assistance) cost taxpayers more than $11bn per year.

[31] For example, in an article bringing up how little taxes Amazon.com Inc. pays in Europe, a spokesman tells the Financial Times (2017): "Amazon pays all the taxes that are required in every country where we operate […] We operate a pan-European business from our headquarters in Luxembourg where we have over 1,500 employees and growing, including our senior leadership team. We've invested over €20bn in Europe since 2010, and expect to hire 15,000 new employees this year, bringing our total permanent European workforce to over 65,000 people."

[32] As noticed by Jung, Lee, and Weber (2014), labor costs in the manufacturing sector were about $784bn in 2008 compared to a total capital expenditure of $166bn.

that can make firms more cautious when investing. Firms avoiding taxes are exposed to potential reductions of cash flow and investor wealth if, following an investigation, tax authorities rule the firm's tax strategy abusive. For example, tax authorities can enforce penalties, additional payments of taxes and interests[33] and firms may also experience reputational loss due to increased public scrutiny (sometimes referred to as "tax shaming").

Empirical evidence suggests that tax risks impact firms' overall risk (Hanlon and Slemrod 2009; Kim, Li, and Zhang 2011; Guenther, Matsunaga, and Williams 2017) and that firms take action to reduce tax risks (Dyreng, Hoopes, and Wilde 2016). Similarly, tax avoidance can also generate tax uncertainty (proxied by additions to the unrecognised tax benefit (UTB) reserve) (Dyreng, Hanlon, and Maydew 2019) and firms are found to increase their cash balances as a way to hedge themselves from future tax payments (Hanlon, Maydew, and Saavedra 2017).

A number of studies in the real option literature provide evidence that firms withhold investments in presence of uncertainty ("wait and see" strategy (Bloom, Bond, and Van Reenen 2007)) and Dixit (1997) shows that a similar pattern also applies to labour investments[34]. Investments in human capital matter for firms' retaining policies because the adjustment costs of labour are arguably high. For example firms incur the costs of searching, selecting, hiring, training and possibly firing (Bentolila and Bertola 1990; Dixit 1997) and these costs increase with higher job-specific skills (Ghaly, Anh Dang, and Stathopoulos 2017).

Tax avoidance is a substantial source of uncertainty to firms' labour investments for several reasons. First, tax savings from tax avoidance are generally large. For example, Wilson (2009) estimates federal tax savings for the average tax shelter transaction to be of about $375.5m and, globally and the OECD (2013) calculates the loss from corporate tax revenues attributable to tax evasion and tax avoidance in the range of $100bn and $240bn per year. Uncertainty about future payments of unpaid taxes, interests and penalties can arguably lead firms to withhold their investments and especially those in human capital given their relatively high adjustment costs.

[33] For example, the European Union requires payments for previously unpaid taxes of €13bn from Apple Inc. and €250m from Amazon.com Inc. (The Guardian 2016).
[34] Among the others, Trigeorgis and Reuer (2017) provide a recent review of the real options literature.

Second, uncertainty concerning tax avoidance likely extends over multiple years and can generate extra-costs (for example legal costs) that distract resources otherwise available for other investments[35]. Third, tax risks and uncertainty increase if domestic and foreign policy-makers and tax authorities implement sudden changes to tax and disclosure legislations. For example, the growing international tax co-operation between countries can enhance transparency and raise significant risks and uncertainties to firms engaging in tax avoidance (OECD 2013). This has in turn potential implications for firms' investments, especially those subject to high adjustment cost, such as human capital.

Fourth, tax uncertainty can also stem from news specifically targeting firms engaging in tax avoidance. Empirical evidence from stock market returns show that stock price declines following the public revelation of firms engaging in tax sheltering activities (Kim et al. 2011), especially for firms in the retail sector (Hanlon and Slemrod 2009); thereby pointing to a reputational interpretation of tax avoidance. Consistent with this argument, Dyreng et al. (2016) find that firms' tax and disclosure strategies respond to public pressure and a survey led by Graham, Hanlon, Shevlin, and Shroff (2014) shows that a large majority of tax executives in their sample (69%) rank reputational concerns as an important factor deterring firms from avoiding taxes.

All the arguments above suggest that firms are likely to respond to increased uncertainty and risks from tax avoidance by withholding their investments and more specifically their labour demand. Therefore, I posit that firms with low cash effective tax rates (Low Cash ETR) undertake sub-optimal labour investments with respect to the level expected based on the firms' economic fundamentals and industry medians.

I lead my analysis on a sample of 3,062 publicly listed U.S. firms over the years 1992-2017. Following Pinnuck and Lillis (2007) and Jung, Lee, and Weber (2014), I compute an inverse measure of labour efficiency as the absolute value of the difference between a firm's net hiring and its expected level. The expected labour investment is based on a model of firms' change in hiring policies as a function of sales growth, profitability, liquidity and leverage developed by Pinnuck and Lillis (2007). This variable, therefore, captures changes in firms' hiring policies that cannot be explained by the firms' underlying economic fundamentals. In supplemental analysis, I replace

[35] For instance, in 2017 the European Union asked Apple Inc. to pay previously unpaid taxes for the years from 1991 through 2015 (The Guardian 2016)

the expected level of hiring with the industry-median net hiring and average net hiring in the previous three years. These variables, therefore, capture deviations of firms' changes in hiring policies from industry and prior years' human capital investments.

I find that firms with Low Cash ETR in the current year increase abnormal investments in net hiring in the following year. However, my results provide evidence that the effect is driven by a sub-sample of firms with net hiring below the expected level, which suggests that firms engaging in more aggressive tax avoidance also under-invest in labour force. I also present evidence that the positive relation between tax avoidance and sub-optimal labour investment is stronger for firms that are more exposed to tax risks and uncertainties as proxied by the volatility of firms' cash effective tax rates (Cash ETR) over a period of five years and additions to the unrecognised tax benefit (UTB) reserve, respectively.

One source of concern with a causal interpretation of the effect of corporate tax policies on labour investments is that results can be biased because of the potential endogeneity that such a relation may entail. For example, firms' net hiring choices may reflect firm-specific characteristics that are unobservable to the researcher and that can also affect tax avoidance ability and opportunities. To address this issue, I run my analysis including several control variables in addition to industry and year fixed effects.

Another source of concern is reverse causality. That is, labour investment decisions may affect tax avoidance opportunities available to firms, for example, by providing access to governmental grants and tax credits. I address this concern by regressing current abnormal net hiring values on prior-year corporate tax avoidance and by exploiting a plausibly exogenous source of variation in U.S. firms' tax avoidance in a quasi-natural experiment setting, where firms in the control group are selected using propensity score matching (PSM).

I find a positive and significant association between Low Cash ETR and firms' investments in human capital in the whole sample of U.S. publicly listed firms between the years 1992 and 2017. However, after breaking down the sample into firms with net hiring above (over-investment) and below (under-investment) the level justified by their underlying economic fundamentals, I find that the effect of tax avoidance on labour is asymmetric: it is statistically insignificant for firms over-investing in labour whereas it is positive and significant for firms under-investing in human capital.

Overall, this result suggests that firms with Low Cash ETR increase sub-optimal hiring policies, by choosing a level of net hiring that is below the one expected based firms' fundamentals and industry medians.

To provide a causal support to my findings, I then exploit Ireland's statutory corporate tax cut occurred in December 1997 using a difference-in-differences design. For this test, my treatment group consists of U.S. multinationals with operations in Ireland before and during the phased reduction of the statutory tax rate that began in December 1997, whereas my control group includes U.S. multinationals with foreign operations in countries other than Ireland. Firms in the control group represent the best match (nearest neighbour with replacement) to firms in the treatment group based on several lagged (two-year lag) covariates (Cash ETR, Market-to-book, Size, PP&E, Global pre-tax income and Foreign-only pre-tax income) and industry fixed effects. Overall, results from this tests are consistent with my main findings, in that, following the reduction in Ireland's statutory corporate tax rate, firms with Irish operations withhold their investments in human capital compared to firms without Irish operations.

Next, I examine whether firms exposed to greater tax risks and uncertainties are associated with abnormal net hiring. The rationale of this test lays in the precautionary motives that can lead firms to choose a level of net hiring below the expected level (Bloom et al. 2007). I first examine a sub-sample of firms with high tax risk (proxied by a five-year volatility of Cash ETR above the sample median) and find that the effect on abnormal net hiring is stronger for this group of firms. Second, I use firms' uncertain tax positions (proxied by UTB above the sample median) to investigate whether firms with higher tax uncertainty undertake abnormal labour investments. Consistent with my prediction, I find that firms exposed to tax uncertainties choose a level of net hiring that deviates from the expected level based on firms' fundamentals.

Finally, I examine whether the effect of tax avoidance is mitigated by higher labour adjustment costs. Consistent with the view of labour costs affecting firms' decision-making, Ghaly et al. (2017) find that firms hold larger cash balances as a precautionary measure against possible future volatility in the supply of skilled workers. To test whether labour costs influence my results, I divide the sample between firms operating in industries with larger percentages of skilled labour and those operating in industries

with lower demand of skilled human capital[36]. I find that the effect of tax avoidance on abnormal net hiring is positive and significant only in the sub-sample of firms under-investing in labour force. In contrast, the effect is statistically insignificant for firms exhibiting labour investments above the expected level based on their economic fundamentals. Overall, these results lend support to the view of labour's large adjustment costs playing an important role in the effect of tax avoidance on firms' sub-optimal hiring policies.

Chapter 4 connects several strands of the literature. The first focuses on tax risk and uncertainty. One potential consequence of firms avoiding taxes is the risk of incurring additional payments of greater taxes, interests and penalties and potential reputational loss if the tax strategy is later ruled improper, resulting in reduced cash flow and investor wealth. Empirical evidence suggests that tax risks can impact firms' overall risk (Hanlon and Slemrod 2009; Kim et al. 2011; Guenther et al. 2017) and that firms take action to reduce tax risks (Dyreng et al. 2016). Tax avoidance can also generate tax uncertainty (Dyreng et al. 2019) and firms are found to increase their cash balances as a way hedge themselves from future tax payments (Hanlon et al. 2017). Chapter 4 contributes to this literature by presenting evidence that tax risks and uncertainties can affect firms' resource allocation by leading firms to make sub-optimal hiring decisions.

The second strand of the literature focuses on the effect of uncertainty on real options. Prior studies suggest that in the presence of uncertainty firms are less likely to undertake costly investments or disinvestments (i.e. inaction) (Dixit and Pindyck 1995; Bloom et al. 2007; Trigeorgis and Reuer 2017) and that uncertainty affects labour policies by leading firms to minimize costly adjustments due to hiring and firing (i.e. retention policies) (Oi 1962; Bentolila and Bertola 1990; Dixit 1997; Banker, Byzalov, and Chen 2013; Ghaly et al. 2017). Chapter 4 adds to this strand of research by studying tax avoidance as a source of uncertainty and by providing evidence that tax avoidance affects firms' labour policies leading to sub-optimal hiring decisions relative to the expected level based on firms' fundamentals and industry medians.

[36] Following Ghaly et al. (2017), I compute High skill as an indicator variable that equals one if the Labour Skill Index (LSI) is above the median and zero otherwise. See Table A.4.1 for all variable descriptions.

The third strand of literature focuses on the consequences of tax avoidance for corporate stakeholders. Overall, evidence from this area of research are consistent with the view of tax avoidance affecting different capital providers asymmetrically; with equity holders sharing the benefits of greater tax savings (Desai and Dharmapala 2009; Wilson 2009; Goh, Lee, Lim, and Shevlin 2016; Rego, Williams, and Wilson 2017)[37] whereas debt holders being exposed to the risks, but not sharing the benefits, of firms' more aggressive tax strategies (Shevlin, Urcan, and Vasvari 2013; Hasan, Hoi, Wu, and Zhang 2014). Chapter 4 extends this literature by focusing on an important class of corporate stakeholders - firms' workers and employees - and by presenting evidence that tax avoidance, involving the risks of future additional tax payments, penalties and reputational loss, leads firms to make sub-optimal labour investment decisions.

Finally, chapter 4 uses a similar setting as prior research on labour investment efficiency but asks a substantially different research question. More specifically, while Jung et al. (2014), Ben-Nasr and Alshwer (2016) and Ghaly, Dang, and Stathopoulos (2015) study whether information quality and shareholder monitoring affect a firm's labour investment that is justified by the firm's economic fundamentals, chapter 4 investigates whether firms exposed to higher tax risks and uncertainties make sub-optimal hiring decisions. To isolate the effect of tax avoidance from information quality and shareholder monitoring, I control for institutional ownership and include a measure of accounting quality in supplemental analysis. Overall, results are largely unaffected by these additions, consistent with a tax interpretation of my results.

Findings of chapter 4 can also have important policy implications. First, by showing that tax avoidance reduces firms' investments into labour, my findings can be relevant to regulators, legislators and other corporate stakeholders when designing incentive mechanisms to foster employment. On this spirit, chapter 4 contributes to Ljungqvist and Smolyansky (2016) who find no association between state corporate tax cuts and increases in employment in the U.S. and to Shevlin, Shivakumar, and Urcan (2018) who find a positive association between an tax avoidance and employment in a multi-

[37] Within this literature, Desai and Dharmapala (2009) and Wilson (2009) find that tax avoidance is positively associated with firm value in firms with shareholder-centric corporate governance and Hanlon and Slemrod (2009), Kim et al. (2011) and Gallemore, Maydew, and Thornock (2014) present evidence of a negative stock market reaction to the news of a firm's involvement in tax sheltering activities. More specifically, Hanlon and Slemrod (2009) find that the negative market reaction is stronger for firms in the retail sector, suggesting reputational costs associated with aggressive tax avoidance, whereas Gallemore et al. (2014) provide evidence that the decline in abnormal returns that follows the public revelation a firm's tax sheltering activity is only temporary.

country study by showing that, at least for a sub-set of firms with opportunities to avoid taxes, tax avoidance leads firms to make sub-optimal hiring decisions relative to the hiring level justified by firms' underlying economic fundamentals and industry medians.

Second, my finding that contractions in labour demand are stronger for firms with greater tax risks and uncertainty can be informative to legislators and other policy-makers when designing tax incentives to labour. Consistent with Dixit and Pindyck (1995), Dixit (1997) and Bloom et al. (2007), results of chapter 4 also suggest that fiscal stimuli to labour may be less effective in presence of tax risks and uncertainty. Moreover, my findings can be informative to legislators and to labour unions when contracting stricter employment protection mechanisms and wage increases (Bentolila and Bertola 1990; Banker et al. 2013; Hassett and Mathur 2015) and can provide an additional explanation to the fall of the labour share of GDP investigated by Autor, Dorn, Katz, Patterson, and Van Reenen (2017). The remainder of this chapter is organized as follows: section 4.2 presents my data and research design, section 4.3 shows and discusses my findings and section 4.4 concludes.

4.2 Data and research design

Using a sample that encompasses 3,062 publicly listed U.S. firms over the years 1992-2017, this study investigates the effect of tax avoidance on firms' labour investments. I start the sample in 1992 to allow enough years in the pre-treatment period of Ireland's statutory corporate tax cut occurred in December 1997 through January 2003. Overall, the final sample includes 21,971 firm-year observations.

I collect the data about labour investment and tax avoidance from Compustat. Starting from the whole population of firms in the database over the years 1992-2017, I remove utilities (SIC codes 4900-4999) and financial services firms (SIC codes 6000-6999) as these firms are subject to different regulations. Moreover, I drop all firms with negative pre-tax income and missing data in any dependent, explanatory or control variable. By construction, I require each firm in the sample to report the relevant financial information for at least three subsequent years. Finally, I winsorize all variables at 1% level to mitigate the influence of extreme values on the analysis. Variable definitions are in Table A.4.1 and descriptive statistics are in Tables 1 and 2.

4.2.1 Labour investment variables

The level of labour investments undertaken by firms is, for each year, the absolute value of a firm's abnormal net hiring activity relative to the expected change in labour force based on the firm's underlying economic fundamentals (|Abnormal net hire|). Conceptually, deviations from expected levels of hiring indicate sub-optimal labour investments undertaken by firms (abnormal net hiring = actual net hiring - expected net hiring). In this study, I examine whether firms' tax aggressiveness leads to sub-optimal investment decisions in human capital.

Pinnuck and Lillis (2007) estimate for each firm-year the expected level of net hiring by regressing the percentage change in a firm's labour force on a number of variables capturing the firm's economic fundamentals (such as sales growth, profitability, size, liquidity and leverage). Similar to Pinnuck and Lillis (2007), I estimate Model (1) using the following equation:

$$\begin{aligned}\text{Net hire}_{it} = {} & \alpha_0 + \alpha_1 \text{Sales growth}_{it-1} + \alpha_2 \text{Sales growth}_{it} + \alpha_3 \Delta\text{ROA}_{it} \\ & + \alpha_4 \Delta\text{ROA}_{it-1} + \alpha_5 \text{ROA}_{it} + \alpha_6 \text{Return}_{it} + \alpha_7 \text{Size\_r}_{it-1} \\ & + \alpha_8 \text{Quick ratio}_{it-1} + \alpha_9 \Delta\text{Quick ratio}_{it-1} \\ & + \alpha_{10} \Delta\text{Quick ratio}_{it} + \alpha_{11} \text{Leverage}_{it-1} \\ & + \alpha_{12} \text{Loss bin1}_{it-1} + \alpha_{13} \text{Loss bin2}_{it-1} \\ & + \alpha_{14} \text{Loss bin3}_{it-1} + \alpha_{15} \text{Loss bin4}_{it-1} \\ & + \alpha_{16} \text{Loss bin5}_{it-1} + \alpha_j \text{Industry FE} + \varepsilon_{it}, \end{aligned} \quad (1)$$

where Net hire is the percentage change in employees for firm i at the end of year t, Sales growth is the percentage change in revenues from sales, ROA is net income divided by total assets at the beginning of the year, Return is the annual stock return, Size_r is the percentile rank of the natural logarithm of market value at the beginning of the year, Quick ratio is the sum of cash, short term investments and receivables divided by current liabilities, Leverage is long term debt divided by total assets at the beginning of the year and Loss bin variables indicate 0.005 loss intervals between -0.005 and 0 of prior year ROA. All variables are defined in Table A.4.1.

Descriptive statistics in panel A of Table 4.1 report a mean (median) Net hire of 8% (2%) in Model (1), indicating that labour force increased on average in the sample of U.S. firms between 1992 and 2017. Net hire is -5% in the 25th percentile and 13% in the 75th percentile. Sample averages show a positive Sales growth (18%) and stock Return (1%) but a negative return on assets (ROA) (-5%) during the period. Finally, on average Quick ratio is 2.07 and Leverage is 24%.

Panel B of Table 4.1 presents the results of Model (1). Coefficient estimates show that Net hire is positively associated with sale growth (Sales growth$_{it-1}$ and Sales growth$_{it}$), profitability (ROA$_{it}$), stock return (Return$_{it}$), firm size (Size$_{it-1}$) and liquidity (Quick$_{it-1}$ and ΔQuick$_{it-1}$). In contrast, changes in profitability (ΔROA$_{it}$ and ΔROA$_{it-1}$), current liquidity (ΔQuick ratio$_{it}$), leverage (Leverage$_{it-1}$) and small reported losses (Loss bin variables) are negatively associated with Net hire. Overall, these estimates are consistent with those reported by Pinnuck and Lillis (2007) and Jung, Lee, and Weber (2014), thus giving additional support to my analysis.

The residual estimate from Model (1) provides a measure of labour investment that captures deviations from the expected level of hiring based on firms' economic characteristics. My main labour investment variable (|Abnormal net hire|) is, then, the absolute value of the residual from Model (1). Descriptive statistics in panel A of Table 4.2 report an average (median) |Abnormal net hire| of 0.13 (0.07), which is also consistent with the average (median) value for this variable found by (Jung et al. 2014). Figure 4.1 shows the time trend of Net hire (blue line in the middle) and |Abnormal net hire| broken down into its two components: a firm's net hiring above its expected level (red line at the top) and a firm's net hiring below its expected level (green line at the bottom).

In supplemental analyses, I replace the expected level of net hiring using the industry median net hiring (|Abnormal ind. adj. net hire|) and firms' average net hiring in the previous three years (|Abnormal av. net hire|). Therefore, unlike |Abnormal net hire| which reflects deviations from expected levels of hiring based on firms' own economic characteristics, |Abnormal ind. adj. net hire| and |Abnormal av. net hire| capture deviations from the median labour force employed in the industry and previous years' average net hiring, respectively.

4.2.2 Tax avoidance variables

I use Low Cash ETR as my primary measure of tax avoidance. Low Cash ETR is an indicator variable that equals one if the Cash ETR of a firm (computed as Income taxes paid / (Pre-tax income – Special items)) is in the first quartile (or twenty-fifth percentile) of the Cash ETR distribution. Panel B of Table 4.2 shows that firm-year observations in the first quartile have a mean (median) Cash ETR equal to 0.04 (0.03) with a minimum value of 0.00 and a maximum value of 0.10. In contrast, Cash ETR is on average (median) equal to 0.16 (0.17), 0.27 (0.27) and 0.48 (0.41) for firm-year observations in the second, third and fourth quartile, respectively. Overall, panel B of Table 4.2 indicates that firms in the first quartile of the Cash ETR distribution engage in more aggressive tax avoidance as they pay a smaller amount of taxes relative to other firms.

I use Cash ETR for my main analysis because effective tax rates are easy to compute and easily observable by corporate shareholders and other stakeholders, such as employees, trade unions and media (Chyz et al. 2013). By construction, Cash ETR capture all firms engaging in non-conforming (but not conforming) tax avoidance activities and strategies that lead to a reduction of corporate tax payments. Relative to GAAP ETR (computed as Total income taxes / (Pre-tax income – Special items), Cash ETR reflects also tax deferral strategies aimed at postponing current tax payments to future fiscal periods as well as current payments of taxes due in previous periods (Dyreng, Hanlon, and Maydew 2008; Hanlon and Heitzman 2010).

Panel C of Table 4.2 reports the distribution of firms with Low Cash ETR by industry using the Fama-French 48 industry classification. The largest number of firms with Low Cash ETR in my sample operate in the Electronic Equipment sector (925 firm-year observations), followed by the Business Services (867 observations) and Computers (496 observations) sectors. In line with anecdotal evidence and prior studies (for example, Dyreng, Lindsey, and Thornock (2013)), firms operating in these industries have larger opportunities to avoid taxes by taking advantage of intangible assets, R&D expenses and their likely global supply chain. Finally, panel C shows that firms with the lowest average Cash ETR operate in the Precious Metal (0.01) and Shipbuilding, Railroad Equipment (0.01) industries.

4.2.3 Control variables

I include a number of control variables that previous studies have found to affect tax avoidance and labour investments. The first set of variables of Model (2) helps separate the effect of tax avoidance on firms' hiring policies from other firm-specific characteristics (Size and Leverage). For example, while large firms are potentially subject to higher tax payments, leveraged firms can benefit from tax deductions of their interest expenses. Controlling for these factors appears particularly important because large firms are often also among the largest employers whereas firms experiencing financial distress are traditionally associated with large layoffs (Manzon and Plesko 2002; Frank, Lynch, and Rego 2009; Berk, Stanton, and Zechner 2010).

The second set of variables controls for factors that can affect firms' investments in general, such as growth opportunities (Market-to-book), liquidity (Quick ratio), dividend payout policies (Dividend), cash flow and sales volatilities (CFO volatility and Sales volatility), and tangible capital (PP&E) (McNichols and Stubben 2008; Biddle, Hilary, and Verdi 2009; Jung et al. 2014). In addition, because firms' investments can reflect managerial empire building behaviour, I also control for differences in shareholders' monitoring on corporate management across firms (Institutional ownership) (Chen, Harford, and Li 2007; Hall 2016; Asker, Farre-Mensa, and Ljungqvist 2015; Ghaly et al. 2015).

The third set of control variables can directly affect firms' labour investments. Namely, these variables are Labour intensity, Net hire volatility and the percentage of union membership per industry (Unionized labour) (Chyz et al. 2013; Bova 2013; Jung et al. 2014). Finally, to control for the effect of other (non-labour) investment decisions on firms' labour policies, Model (2) includes the variable |Abnormal other investment| computed as the absolute value of the residual of the following model: Other investment = $\beta_0 + \beta_1$Sale growth$_{it-1} + \varepsilon_{it}$, where Other investment is the sum of capital, acquisition and R&D expenses minus cash receipts from the sale of PP&E divided by one-year lag total assets (Jung et al. 2014). As a result, I estimate Model (2) using the following equation:

$$
\begin{aligned}
&|\text{Abnormal net hire}|_{it} \\
&\quad = \beta_0 + \beta_1 \text{Low Cash ETR}_{it-1} \\
&\quad + \beta_2 \text{Market} - \text{to} - \text{book}_{it-1} + \beta_3 \text{Size}_{it-1} \\
&\quad + \beta_4 \text{Quick ratio}_{it-1} + \beta_5 \text{Leverage}_{it-1} + \beta_6 \text{Dividend}_{it-1} \\
&\quad + \beta_7 \text{CFO volatility}_{it-1} + \beta_8 \text{Sales volatility}_{it-1} \\
&\quad + \beta_9 \text{PP\&E}_{it-1} + \beta_{11} \text{Insitutional ownership}_{it-1} \\
&\quad + \beta_{12} \text{Net hire volatility}_{it-1} + \beta_{13} \text{Labor intensity}_{it-1} \\
&\quad + \beta_{14} \text{Unionized labor}_{it-1} \\
&\quad + \beta_{15} |\text{Abnormal other investment}|_{it-1} + \beta_j \text{Industry FE} \\
&\quad + \beta_i \text{Year FE} + \varepsilon_{it},
\end{aligned}
\tag{2}
$$

where Market-to-book is the ratio market to book value of common equity at the beginning of the year, Size is the natural logarithm of market value of equity at the beginning of the year, Dividend is an indicator variable that equals one if a firm pays dividends in the previous year and zero otherwise, CFO volatility is the standard deviation of cash flow from operations over the years t-5 to t-1, Sales volatility is the standard deviation of revenues from sales over the years t-5 to t-1, PP&E is property, plant and equipment divided by total assets, Institutional ownership is for each firm-year the sum of the holdings of institutional investors divided by the firm market capitalization in the previous year, Net hire volatility is the standard deviation of the percentage change in employees over the years t-5 to t-1, Labour intensity is number of employees divided by total assets at the beginning of the year, Unionized labour is the industry-level rate of labour unionization in the previous year and |Abnormal other investment| is the absolute value of the residual from the following model: Other investment = $\beta_0 + \beta_1 \text{Sale growth}_{it-1} + \varepsilon_{it}$, and all other variables are as previously defined and described in Table A.4.1. All explanatory and control variables are lagged by one year to mitigate simultaneous causality concerns and panel A of Table 4.2 presents descriptive statistics.

4.3 Results

4.3.1 Univariate and multivariate results

Table 4.3 reports pairwise correlation coefficients. |Abnormal net hire| is positively correlated with Low Cash ETR, suggesting that firms engaging in more aggressive tax avoidance undertake sub-optimal labour investments. Similarly, firms experiencing growth (for example proxied by Market-to-book and |Abnormal other investment|) and uncertainties (for example proxied by CFO volatility, Sale volatility and Net hire volatility) are positively associated with |Abnormal net hire|. In contrast, larger (Size), leveraged (Leverage) and dividend paying firms (Dividend) are negatively associated with |Abnormal net hire|.

Table 4.4 reports the results of Model (2). Consistent with univariate findings, the coefficient estimates on Low Cash ETR in column 1 is positive and significant (0.0079), which suggests that firms engaging in tax avoidance undertake sub-optimal labour investments. Moreover, |Abnormal net hire| is positively associated with firms experiencing growth (Market-to-book and |Abnormal other investment|) and uncertainties (Quick ratio, CFO volatility, Sales volatility and Labour volatility). In contrast, abnormal hiring is negatively associated with Size, Leverage, Dividend, Labour intensity and Unionized labour.

Column 2 presents the results of Model (2) on a sub-sample of firms with net hiring above its expected level based on firms' fundamentals (over-investment). The coefficient estimate on Low Cash ETR is statistically insignificant, which means that over-investments in human capital are unrelated to tax avoidance. To mitigate the effect of small changes in labour demand, I further divide the over-investment sub-sample between small and large abnormal net hiring based on the median net hiring. In column 3, the dependent variable |Larger abnormal net hire| represents over-investment in labour above the median. Consistent with column 2, results in column 3 show a statistically insignificant coefficient on Low Cash ETR on a sample of firms whose hiring policies are largely more generous than the level justified by the firms' underlying economic fundamentals.

In contrast with these results, column 4 presents a positive and significant coefficient (0.0055) on Low Cash ETR when the sub-sample consists of firms with net hiring below the expected level (under-investment), meaning that firms paying

fewer taxes in the current year under-invest in human capital in the following year. Similarly, focusing exclusively on larger reductions in labour investments (under-investment below the median), results in column 5 suggest that tax avoidance is positively associated with lower hiring policies relative to the level justified by firms' economic fundamentals (0.0097). Overall, columns 2-5 provide evidence that corporate tax avoidance has an asymmetric effect on firms' labour investments: it affects sub-optimal investments towards a lower level of hiring, whereas it is unrelated to over-hiring.

Table 4.5 presents the results of Model (2) after breaking down over-investment into over-hiring (positive expected net hiring) and under-firing (negative expected net hiring), and under-investment into under-hiring (positive expected net hiring) and over-firing (negative expected net hiring) (Jung et al. 2014). Columns 1 and 2 report statistically insignificant coefficients on Low Cash ETR, meaning that tax avoidance is unrelated to firms' over-hiring and under-firing policies relative to the expected labour investment based on their economic fundamentals. In contrast, the coefficient estimate on Low Cash ETR in column 3 is positive and significant. Consistent with my research hypothesis, this result suggests that firms engaging in tax avoidance withhold their investments in human capital; thereby resulting in these firms under-hiring relative to the level justified by the firms' underlying economic characteristics. Finally, results in column 4 indicate that tax avoidance is unrelated to firms under-investing in labour by means of over-firing relative to the expected labour policy.

4.3.2 Tax risk and uncertainty

A number of studies provide evidence that risks and uncertainties can lead firms to withhold investments (Bloom et al. 2007; Gulen and Ion 2015). In this section, I test whether tax risk and uncertainty stemming from potential additional tax payments, interests and reputational loss, lead firms to make sub-optimal hiring decisions. Hiring policies are especially relevant to this setting because of the likely high adjustment costs associated with investments in human capital (Bentolila and Bertola 1990; Dixit 1997; Ghaly et al. 2017). In Table 4.6, I examine the effect of tax avoidance on firms' abnormal net hiring for firms exposed to higher tax risks and uncertainties. Following (Guenther et al. 2017), I proxy for tax risk using an indicator variable that equals one if a firm's Cash ETR volatility over a five-year period is above the sample median and

zero otherwise (Tax risk). Similar to Dyreng et al. (2019) and Guenther, Wilson, and Wu (2018), my proxy for tax uncertainty is the unrecognized tax benefit (UTB) reserve as reported on corporate statements. Tax uncertainty is then an indicator variable which equals one if a firm's UTB is above the sample median and zero otherwise.

Results in columns 1 and 2 of Table 4.6 show that the effect of tax avoidance on over-investments in human capital is statistically insignificant for firms exposed to greater tax risks. In contrast, consistent with my research hypothesis, results in columns 3 and 4 provide evidence that the positive effect of tax avoidance on firms' sub-optimal labour policies is more pronounced for firms subject to higher tax risks and uncertainties. More specifically, the coefficient estimate on Low Cash ETR on a sub-sample of high tax risk firms (column 3) is approximately 0.0057. Similarly, column 4 reports a coefficient estimate of 0.0089 Low Cash ETR suggesting that firms exposed to tax risks and uncertainty exhibit a level of net hiring below the expectations based on firms' economic fundamentals.

Overall, these results are consistent with the view that firms experiencing risks and uncertainties are more likely to be cautious when making investment decisions (Bloom et al. 2007), thereby leading to sub-optimal investments relative to the level justified by their underlying economic characteristics. Firms' tax avoidance and labour investments choices are especially relevant in such a setting because of the high adjustment costs associated with hiring and firing (Oi 1962; Bentolila and Bertola 1990) and the greater tax risks and uncertainties faced by firms engaging in corporate tax avoidance (Guenther et al. 2017; Dyreng et al. 2019).

4.3.3 Labour cost and financial constraints

Table 4.7, panel A, presents the results of the effect of tax avoidance on labour investment after splitting the sample between firms operating in high-skill industries, and therefore exposed to higher adjustment costs of labour, and those that rely less on skilled human capital. Following Ghaly et al. (2017), I measure job-specific skills using the industry-level Labour Skill Index (LSI) and compute High skill as an indicator variable that equals one if a firms' LSI is above the sample median and zero otherwise. In robustness tests, I measure labour cost more directly using the staff cost reported by firms in their financial statements.

Columns 1 and 2 of panel A show a statistically insignificant coefficient on Low Cash ETR for firms that over-invest in labour force and for both sub-samples of firms operating in industries that require a higher percentage of skilled labour and those that rely on a less skilled workforce. In contrast, the coefficient estimate on Low Cash ETR in column 3 is positive and significant for firms that under-invest in labour and require larger skilled human capital to carry on their activity. Consistent with my research hypothesis, this result suggests that firms with Low Cash ETR are more likely to withhold their hiring policies when adjustment costs of labour are higher. Finally, results in column 4 indicate that the positive effect of tax avoidance on firms' sub-optimal labour investments vanishes in the sub-sample of firms exhibiting lower percentages of skilled human capital.

Panel B of Table 4.7 reports the results after splitting the sample between financially constrained and unconstrained companies based on the median Leverage[38]. The rationale of this test lays on the potential reverse causality issue brought about by financial constraints on the relation subject to estimation. That is, firms experiencing financially constraints may engage in tax avoidance as a way to increase their cash balances and at the same time hire less in response to the adverse financial condition. Results in panel B mitigate this concern by presenting evidence that the effect of tax avoidance on firms' under-investment in labour force is positive and significant for both constrained and unconstrained firms, at 5 and 10% levels of significance.

4.3.4 Ireland's statutory corporate tax rate cut: Quasi-natural experiment

A cause of concern in estimating the effect of corporate tax avoidance on firms' labour investments is the potential endogeneity that such a relation may entail. For example, unobservable firm-specific characteristics (for instance, related to managerial preferences) could affect both firms' (labour) investments and tax policies, thereby leading to biased results. To mitigate this concern, I analyse the relation between tax avoidance and labour investment around Ireland's statutory corporate tax cut occurred

[38] On this spirit, Lamont, Polk, and Saa-Requejo (2001) show that financially constrained firms document high leverage levels. Similarly, Whited (1992) suggests that firms with low leverage are relatively unconstrained because they can access external sources of financing more easily.

in December 1997 in a quasi-natural experiment design using difference-in-differences regressions.

Starting in December 1997, indeed, Ireland began a phased reduction of its corporate tax rate, taking it down to 12.5% from an original rate of 32% by January 1, 2003. Anecdotal evidence suggests that following the reduction of Ireland's statutory corporate tax rate, tax planning by North American and European multinationals with operations in Ireland substantially increased to take advantage of the lower tax rate. One channel traditionally employed by multinational firms to shift profits from a high tax country to a lower tax country is transfer pricing. Relevant to my study, international transfer pricing transactions are also exposed to a high degree of uncertainty (Klassen, Lisowsky, and Mescall 2017; Towery 2017; Drake, Goldman, and Murphy 2018). Therefore, I use the Irish tax cut of December 1997 to provide a causal support to my analysis. More specifically, I estimate the following difference-in-differences equation (3):

$$\begin{aligned} &|\text{Abnormal net hire}| \\ &\quad = \gamma_0 + \gamma_1 \text{Treated} \times \text{Post} + \gamma_2 \text{Treated} + \gamma_3 \text{Post} \\ &\quad + \gamma_j \text{Industry FE} + \gamma_i \text{Year FE} + \varepsilon \end{aligned} \tag{3}$$

Where Treated × Post is the interaction term that captures the effect of the Irish statutory tax cut on the treated group relative to the unaffected control group. Post is an indicator variable that equals one from 1998 (year in which the phased reduction of Ireland's statutory corporate tax began) onward and Treated is an indicator variable that equals one if a firm-year is in the treatment group and zero otherwise.

The treatment group consists of U.S. multinationals with operations in Ireland (Treated = 1), whereas the control group includes U.S. multinationals with operations in countries other than Ireland (Treated = 0). I identify the location of U.S. multinationals' foreign subsidiaries using Exhibit 21 data available on Scott Dyreng's website (Dyreng and Lindsey 2009). Each firm in the control group is matched with one firm in the treatment group (nearest neighbour with replacement) based on several lagged (two-year lags) covariates (Cash ETR, Market-to-book value, Size, PP&E,

(Global) pre-tax income and Foreign pre-tax income) and industry fixed effects. The analysis is led on a sample that includes only treated and control firms.

Figure 4.2 shows the annual Cash ETR averages for treatment (lower blue line) and control (upper red line) groups. Before the introduction of the Irish corporate tax cut in December 1997 (which entered into force in January 1, 1998), the tax payments of treatment and control groups were aligned, as shown by the parallel trend before January 1998 (which is represented by the vertical red line). After the introduction of the statutory tax cut, the average tax payment of U.S. multinationals with Irish operations (Treated = 1) decreases substantially (from about 0.30 to 0.24 in the two following years) diverging from the tax payments of U.S. multinationals with foreign operations in countries other than Ireland (Treated = 0) which show a rather flat trend. Overall, figure 4.2 suggests that the matched control group is a good counterfactual to U.S. multinationals with operations in Ireland had not the tax cut been introduced.

Table 4.8 presents the results of difference-in-differences analysis around (two-year window) Ireland's statutory corporate tax cut. To isolates the impact of tax avoidance on firms' labour investments from other changes in the Irish legislation, and more generally from changes in the Irish economy, that may be concurrent and potentially correlated with the statutory corporate tax cut, I drop the year 1998 in which the new tax regime began. Moreover, to control for industry- and year-specific unobservable characteristics that might bias my results (such as periods of economic recession), I include industry and year fixed effects.

The coefficient estimate on Treated × Post in column 1 is statistically insignificant, which suggests that firms' abnormal labour policies are unrelated to tax avoidance. Yet, after breaking down |Abnormal net hire| into its components (over- and under-investment), I find a positive and significant coefficient on Treated × Post for a sub-sample of firms that under-invest in human capital (0.0278), whereas the coefficient on Treated × Post is statistically insignificant for the sub-sample of firms that over-invest in labour. Overall, in line with my research hypothesis and the above analysis, these results indicate that the greater tax avoidance opportunities available to U.S. multinationals following the reduction of Ireland's statutory tax rate lead firms to undertake sub-optimal hiring policies by retaining their investments in human capital by about 3 percentage points.

4.3.5 Tax credits and tax grants to labour investments

Another potential source of endogeneity may stem from tax credits and other incentives to labour investment granted by local governments (i.e. at state level) or foreign countries to U.S. domestic and multinational firms. For example, firms can take advantage of tax incentives aiming at stimulating employment and economic growth to lower their tax payments. If regressions pick up this effect, my coefficient estimates would be biased towards finding larger over-investments in labour. My results above provide evidence that this not the case, with coefficients on Low Cash ETR constantly insignificant in the sub-sample of firms over-investing in human capital. An interpretation of this finding is that firms engaging in tax avoidance have access to similar opportunities to reduce their tax payments, perhaps reflected in tax avoiders' concentration in specific industries (panel C of Table 4.2 shows that Electronic Equipment and Business Services industries together account for 33% of firm-year observations in the Low Cash ETR sub-sample).

To further address endogeneity, I follow Armstrong, Blouin, Jagolinzer, and Larcker (2015) and Shevlin et al. (2018) and construct a proxy for tax avoidance that is adjusted for firms' peers' tax avoidance positions. More specifically, using a sample that includes only U.S. domestic firms without foreign operations, I first compute the difference between a firm's Cash ETR and the average Cash ETR of the firm's industry (based on Fama and French (1997) 48 industry classification) and size (based on the sample median of total assets) peers. Second, I divide the distribution of the above difference into quartiles and define firm-year observations in the first quartile (i.e. the one with the lowest difference) as Low peer-adjusted Cash ETR.

The rationale of this test relies on the assumption that U.S. domestic firms operating in similar industries and of similar size should, on average, have access to similar tax incentives[39] and, ultimately, should show consistent tax outcomes in the absence of a more aggressive tax planning approach. That is, while all domestic U.S. firms can similarly benefit from tax incentives (to labour, R&D and capital investments), firms' tax aggressiveness can vary substantially across my sample (see panel B of Table 4.2). As a results, Low peer-adjusted Cash ETR captures U.S.

[39] Chirinko and Wilson (2013) and Heider and Ljungqvist (2015) show that almost all states in the U.S. use tax incentives, in the form of tax credits or tax grants, to stimulate employment and economic growth within the last 30 years.

domestic firms' tax avoidance that exceeds government tax incentives (i.e. proxied by peer average Cash ETR).

Table 4.9 reports the results of Model (2) after controlling for tax incentives to labour in a sample that includes only U.S. domestic firms. The coefficient estimate on Low peer-adjusted Cash ETR is statistically insignificant in column 1, which means that tax avoidance is unrelated to abnormal labour investments after taking into account tax incentives. However, after breaking down |Abnormal net hire| into its two components, I find that the effect is insignificant for a sample of firms with net hiring above the expected level whereas it is positive and significant for the sample of firms with net hiring below the level justified by their economic fundamentals. Overall, these results are consistent with my main findings in Table 4.4, in that they show that firms engaging in tax avoidance in the current year undertake sub-optimal labour investments in the following year regardless of potential asymmetries in firms' ability to (access to and) benefit from governmental tax incentives.

4.3.6 Robustness tests

In panels A and B of Table 4.10, I replace |Abnormal net hire| using |Abnormal ind. adj. net hire| and |Abnormal av. net hire|, respectively. More specifically, |Abnormal ind. adj. net hire| is, for each year, the difference between a firm's net hiring and the industry-median net hiring. Unlike |Abnormal net hire| that reflect deviations from expected levels of hiring based on firms' own economic characteristics, |Abnormal ind. adj. net hire| captures deviations from the median workforce employed in the industry. Results in panel A are substantially unchanged with respect to my main results in Table 4.4. Tax avoidance is associated with firms' sub-optimal hiring policies and, more specifically, firms exhibit labour investments below the level justified by their underlying economic fundamentals.

In panel B of Table 4.10, I replace |Abnormal net hire| using |Abnormal av. net hire|. |Abnormal av. net hire| is, for each year, the difference between a firm's net hiring and the firm's average net hiring in the previous three years. Unlike |Abnormal net hire|, |Abnormal av. net hire| captures deviations from previous years' labour policies. Columns 1 and 2 present statistically insignificant coefficient on Low Cash ETR for both the whole sample and the sub-sample of firms with net hiring above the expected level. However, consistent with my research hypothesis and above results,

firms with Low Cash ETR are positively associated with under-investments in human capital. Overall, results in panels A and B provide evidence that firms engaging in tax avoidance withhold their investments in labour.

Table 4.11 presents a number of additional robustness checks. First, in panel A, I replace Low Cash ETR with Low Cash ETR tercile which extend the number of firm-year observations falling into my tax avoidance definition. Coefficient estimates show that results are substantially unchanged, with firms engaging in tax avoidance in the current year making sub-optimal labour investments in the following year. Similarly, panel B provides evidence that the effect on reduced net hiring is not driven by firms experiencing losses in the previous years and use these losses to minimize Cash ETR.

In panel C, I report the results of Model (2) after dropping all firms that change their labour investments from above to below the level justified by their underlying economic characteristics (and vice versa) between two contiguous years. That is, I remove all firms that over-invest in human capital in the current year and under-invest in the following year and vice versa. After applying this screen, I find that results in Table 4.4 still hold. Similarly, in panel D, I find consistent results with the above analysis on a sample that excludes the financial crisis period (2007-2009). Lastly, in panel E, I run Model (2) on a sub-sample of firms with high staff cost. Similar to results in Table 4.7, I find that the effect of tax avoidance on lower human capital investments is more pronounced in firms that exhibit higher labour costs; consistent with the view of adjustment costs of labour playing an important role in firms' retaining policies.

4.4 Concluding remarks

Chapter 4 addresses the important research question of how tax avoidance affects firms' labour investments. Using a sample of 3,062 U.S. publicly listed firms over the years 1992-2017, I find that firms with low cash effective tax rates (Low Cash ETR), my proxy for tax avoidance, make sub-optimal labour investment decisions and more specifically under-invest in human capital relative to the level justified by their underlying economic fundamentals and industry medians. This result is consistent with tax avoidance generating a withholding effect to firms' hiring opportunities through increased tax risks and uncertainties.

To test this prediction, I then focus on sub-samples of firms exposed to high tax risks (proxied by an ETR volatility over a five-year period above the median) and high

uncertainty (proxied by additions to UTB reserves above the median) in separate regressions. I find the positive effect of tax avoidance on firms' sub-optimal hiring policies to be stronger for firms with high tax risks and uncertainties. In an additional analysis, I also test whether the effect on reduced net hiring is mediated the adjustment cost of labour. To this end, I isolate the impact of labour cost using sub-samples of firms operating in industries with larger percentages of skilled labour and by using a more direct proxy of labour cost (i.e. staff cost). After this test, I continue to find evidence of a positive association between tax avoidance and sub-optimal hiring policies. More importantly, I provide evidence that the effect is more pronounced in presence of high labour costs.

Overall, my results suggest that tax avoidance affects firms' human capital policies by reducing labour investments, consistent with the view of firms withholding their labour demand in response to increased tax risks and uncertainty. These results are also robust to a number of additional tests and to a plausibly exogenous event affecting U.S. firms' tax avoidance opportunities. Finally, these findings can inform policy-makers and other corporate stakeholders (such as labour unions) when designing, implementing or enforcing policies aimed at generating new jobs and stimulating economic growth.

APPENDIX

Table A.4.1. Variable Descriptions

Variable	Description
Model (1):	
Net hire$_{it}$	Percentage change in labour investment (Compustat: (emp-L.emp)/L.emp)
Sales growth$_{it}$	Percentage change in revenues from sales (Compustat: (revt-L.revt)/L.revt)
ROA$_{it}$	Net income divided by one-year lag total assets (Compustat: ni/L.at)
ΔROA$_{it}$	Percentage change in ROA
Return$_{it}$	Total stock return (CRSP: retx)
Size$_{it-1}$	Natural logarithm of market value (Compustat: (csho*prcc_f))
Size_r$_{it-1}$	Percentile rank of Size$_{it-1}$
Quick ratio$_{it-1}$	Quick ratio (Compustat: ((che+rect)/lct)
ΔQuick ratio$_{it-1}$	Percentage change in Quick$_{it-1}$
Leverage$_{it-1}$	Sum of total debt in current and long-term liabilities divided by total assets (Compustat: (dlc+dltt)/at)
Loss bins$_{it-1}$	Negative ROA values separate five bins every 0.005 intervals. Loss bin1=1 if ROA ranges between -0.005 and 0. Loss bin2=1 if ROA ranges between -0.005 and -0.010. Loss bin3=1 if ROA ranges between -0.010 and -0.015. Loss bin4=1 if ROA ranges between -0.015 and -0.020. Loss bin5=1 if ROA ranges between -0.020 and -0.025.
Model (2):	
|Abnormal net hire|$_{it}$	Absolute value of the difference between actual and expected net hire, computed following Pinnuck and Lillis (2007) from Model (1)
Low Cash ETR$_{it-1}$	Indicator variable equal to one if a firm-year observation is in the first quartile of the Cash ETR (Compustat: txtpd/(pi-spi)) distribution, and zero otherwise
Market-to-book$_{it-1}$	Market price at the end of the period times common shares outstanding at the end of the period divided by total assets (Compustat: (csho*prcc_f)/ceq)
Dividend$_{it-1}$	Indicator variable equal one if a firm's paid dividend at the end of the previous period and zero otherwise (Compustat: dvpsp_f)
CFO volatility$_{it-1}$	Standard deviation of cash flow from operation from t-5 to t-1 (Compustat: oancf)
Sales volatility$_{it-1}$	Standard deviation of revenues from sales from t-5 to t-1 (Compustat: revt)
PP&E$_{it-1}$	Net property plant and equipment divided by total assets (Compustat: ppent/at)
Loss firms$_{it-1}$	Indicator variable equal to one if a firm's has negative ROA and zero otherwise
Institutional ownership$_{it-1}$	Percentage of ownership held by institutional investors (Thomson Reuters)
Net hire volatility$_{it-1}$	Standard deviation of net hire from t-5 to t-1
Labour intensity$_{it-1}$	Number of employees divided by total assets (Compustat: emp/at)
Unionized labor$_{it-1}$	Percentage of union membership per year at industry-level (Union Membership and Coverage by Hirsch and Macpherson (2003))

$\|\text{Abnormal other inv.}\|_{it}$	Absolute value of the residual from the following model: Other investment$_{it}$=β_0 + β_1Sale growth$_{it-1}$ + ε_{it}. Where Other investment is the sum of capital, acquisition and R&D expenses minus cash receipts from the sale of PP&E divided by one-year lag total assets (Compustat: $((capx_{it}+aqc_{it}+xrd_{it}-sppe_{it})/at_{it-1})$
Additional variables:	
Over-investment	Net hiring above the expected level (i.e. positive Abnormal net hiring)
Under-investment	Net hiring below the expected level (i.e. negative Abnormal net hiring)
|Larger abnormal net hire|	Above the median over- or under-investment
Over-hire	Over-investment when expected net hiring is positive
Under-fire	Over-investment when expected net hiring is negative
Under-hire	Under-investment when expected net hiring is positive
Over-fire	Under-investment when expected net hiring is negative
Tax risk	Indicator variable equal to one if the standard deviation of Cash ETR over a five-year period is above the median and zero otherwise
Tax uncertainty	Indicator variable equal to one if uncertain tax benefit (UTB) reserve divided by total assets (Compustat: txtubend/at) is above the median and zero otherwise
High skill	Indicator variable equal to one if the Labour Skill Index (LSI) is above the median and zero otherwise. LSI measures the reliance of industries on skilled labour and is computed using OES employment data from the Bureau of Labour statistics and labour skill data from the U.S. Department of Labour's O*NET
Low peer-adjusted Cash ETR	Indicator variable equal to one if a firm is in the first quartile of the peer-adjusted Cash ETR difference distribution. Peer-adjusted Cash ETR is the difference of a firm's Cash ETR and the average Cash ETR of the firm's industry (Fama-French 48) and size (total assets) peers
|Abnormal ind. adj. net hire|	Absolute value of industry-adjusted net hiring, computed as the difference between a firm's net hiring and the industry and year median net hiring
|Abnormal av. net hire|	Absolute value of the difference between a firm's net hiring and the average net hiring of the previous three years
High staff cost	Indicator variable equal to one if staff cost (Compustat: xlr/at) is above the median and zero otherwise

TABLES

Table 4.1. Model (1): Summary Statistics and Regression Results

Panel A. Descriptive statistics

	N	Mean	Median	Std. dev.	25th	75th
Net $hire_{it}$	83,453	0.0831	0.0205	0.3836	-0.0500	0.1333
Sales $growth_{it-1}$	83,453	0.2481	0.0840	0.9440	-0.0303	0.2514
Sales $growth_{it}$	83,453	0.1769	0.0702	0.7729	-0.0431	0.2165
ΔROA_{it}	83,453	0.0070	-0.0009	0.5287	-0.0521	0.0407
ΔROA_{it-1}	83,453	0.0306	-0.0001	0.7159	-0.0519	0.0435
ROA_{it}	83,453	-0.0532	0.0314	0.4710	-0.0652	0.0854
$Return_{it}$	83,453	0.0101	0.0045	0.1667	-0.0695	0.0803
$Size_{it-1}$	83,453	5.6795	5.6604	2.3246	4.0171	7.2603
Quick $ratio_{it-1}$	83,453	2.2005	1.2888	3.0692	0.7881	2.3587
ΔQuick $ratio_{it-1}$	83,453	-0.0523	-0.0071	2.2927	-0.3015	0.2523
ΔQuick $ratio_{it}$	83,453	0.1589	-0.0143	1.3035	-0.2206	0.2083
$Leverage_{it-1}$	83,453	0.2362	0.1732	0.3295	0.0152	0.3435

Panel B. Regression results: Expected and actual net hiring

VARIABLES	(1) Net hire
Sales growth$_{it-1}$	0.0297***
	(0.0039)
Sales growth$_{it}$	0.1600***
	(0.0088)
ΔROA$_{it}$	-0.0761***
	(0.0117)
ΔROA$_{it-1}$	-0.0290***
	(0.0054)
ROA$_{it}$	0.0403***
	(0.0099)
Return$_{it}$	0.0381***
	(0.0099)
Size_r$_{it-1}$	0.0012***
	(0.0002)
Quick ratio$_{it-1}$	0.0054***
	(0.0009)
ΔQuick ratio$_{it-1}$	0.0130***
	(0.0022)
ΔQuick ratio$_{it}$	-0.0053**
	(0.0022)
Leverage$_{it-1}$	-0.0168**
	(0.0065)
Loss bin1$_{it-1}$	-0.0360***
	(0.0077)
Loss bin2$_{it-1}$	-0.0363***
	(0.0071)
Loss bin3$_{it-1}$	-0.0312***
	(0.0116)
Loss bin4$_{it-1}$	-0.0070
	(0.0109)
Los sbin5$_{it-1}$	-0.0297***
	(0.0102)
Observations	65,149
R-squared	0.1142
Industry FE	YES

Table 4.2. Model (2): Summary Statistics

Table 4.4.2 presents descriptive statistics of Cash ETR by quartiles (Panel A) and by industry defined using Fama-French 48 industry classification (Panel B). Panel C reports descriptive statistics of all Model (2)'s variables.

Panel C. Descriptive statistics

	N	Mean	Median	Std. dev.	25th	75th
|Abnormal net hire|	21,971	0.1225	0.0657	0.1890	0.0256	0.1443
Low Cash ETR	21,971	0.2500	0.0000	0.4330	0.0000	1.0000
Market-to-book	21,971	3.0894	2.2907	5.8166	1.4327	3.6865
Size	21,971	6.6885	6.7433	2.2087	5.2125	8.2286
Quick ratio	21,971	1.9626	1.3521	2.1978	0.8584	2.2595
Leverage	21,971	0.4612	0.4465	0.3164	0.2827	0.6003
Dividend	21,971	0.4607	0.0000	0.4985	0.0000	1.0000
CFO volatility	21,971	0.5147	0.3826	0.4416	0.2217	0.6672
Sales volatility	21,971	0.2025	0.1595	0.1766	0.0944	0.2591
PP&E	21,971	0.2276	0.1758	0.1840	0.0875	0.3173
Institutional ownership	21,971	0.2151	0.2134	0.1545	0.0673	0.3409
Net hire volatility	21,971	0.1601	0.1083	0.1676	0.0590	0.1920
Labour intensity	21,971	0.0067	0.0039	0.0084	0.0022	0.0074
Unionized labour	21,971	0.1050	0.1025	0.0367	0.0880	0.1285
|Abnormal other inv.|	21,971	0.1048	0.0926	0.1027	0.0503	0.1302

Panel B. Quartile distribution of Cash ETR

Variable	Quartile	N	Mean	Median	Std. Dev.	Min	Max
Low Cash ETR	**1**	**5,493**	**0.0351**	**0.0290**	**0.0319**	**0.0000**	**0.0982**
-	2	5,493	0.1639	0.1662	0.0354	0.0982	0.2220
-	3	5,493	0.2743	0.2741	0.0300	0.2220	0.3274
High Cash ETR	4	5,492	0.4818	0.4051	0.1877	0.3274	1.0000
Total		21,971	0.2388	0.2220	0.1909	0.0000	1.0000

Panel C. Low Cash ETR by industry

Industry	N	Mean	Industry	N	Mean
Unclassified	18	0.04	Automobiles & Trucks	81	0.04
Agriculture	13	0.05	Aircrafts	43	0.04
Food Products	62	0.03	Shipbuilding, Railroad Equipment	11	0.01
Candy & Soda	6	0.02	Defence	25	0.03
Beer & Liquor	10	0.04	Precious Metals	22	0.01
Recreation	37	0.03	Non-Metallic & Metallic Mining	26	0.05
Printing & Publishing	18	0.04	Coal	5	0.05
Consumer Goods	57	0.04	Petroleum & Natural Gas	81	0.03
Apparel	22	0.03	Communication	117	0.03
Medical Equipment	285	0.04	Personal Services	277	0.03
Pharmaceutical Products	298	0.03	Business Services	867	0.04
Chemicals	163	0.03	Computers	496	0.04
Rubber & Plastic Products	46	0.03	Electronic Equipment	925	0.03
Textiles	10	0.02	Measuring & Control Equipment	232	0.04
Construction Materials	94	0.04	Business Supplies	87	0.04
Construction	7	0.02	Shipping Containers	30	0.04
Steel Works etc.	63	0.03	Transportation	22	0.03
Fabricated Products	19	0.03	Wholesale	169	0.03
Machinery	269	0.04	Retail	271	0.03
Electrical Equipment	52	0.04	Restaurants, Hotels & Motels	155	0.04

Table 4.3. Pairwise Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	|Abnormal net hire|	1.00														
(2)	Low Cash ETR	**0.07**	1.00													
		(0.00)														
(3)	Market-to-book	**0.03**	-0.01	1.00												
		(0.00)	(0.08)													
(4)	Size	**-0.07**	**-0.20**	**0.15**	1.00											
		(0.00)	(0.00)	(0.00)												
(5)	Quick ratio	**0.04**	**0.09**	-0.00	**-0.14**	1.00										
		(0.00)	(0.00)	(0.55)	(0.00)											
(6)	Leverage	**-0.03**	-0.00	0.02	**0.11**	**-0.37**	1.00									
		(0.00)	(0.50)	(0.02)	(0.00)	(0.00)										
(7)	Dividend	**-0.14**	**-0.23**	**0.03**	**0.39**	**-0.16**	**0.10**	1.00								
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)									
(8)	CFO volatility	**0.09**	**0.17**	**-0.05**	**-0.32**	**0.10**	**-0.05**	**-0.25**	1.00							
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)								
(9)	Sales volatility	**0.17**	**0.11**	0.01	-0.02	**0.15**	**-0.05**	**-0.23**	**0.26**	1.00						
		(0.00)	(0.00)	(0.09)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)							
(10)	PP&E	**-0.07**	**-0.05**	**-0.04**	**0.10**	**-0.26**	**0.10**	**0.16**	**-0.18**	**-0.09**	1.00					
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)						
(11)	Institutional ownership	-0.00	**-0.08**	**0.08**	**0.35**	0.01	-0.02	0.01	**-0.12**	0.02	**-0.10**	1.00				
		(0.50)	(0.00)	(0.00)	(0.00)	(0.05)	(0.02)	(0.19)	(0.00)	(0.01)	(0.00)					
(12)	Net hire volatility	**0.15**	**0.13**	**-0.03**	**-0.16**	**0.04**	-0.01	**-0.22**	**0.20**	**0.46**	**-0.10**	**-0.05**	1.00			
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)				
(13)	Labour intensity	0.00	**-0.02**	**-0.03**	**-0.28**	**-0.17**	**0.06**	**-0.09**	-0.02	**-0.08**	**0.31**	**-0.10**	-0.02	1.00		
		(0.81)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)			
(14)	Unionized labour	**0.04**	**0.03**	-0.01	-0.02	**0.10**	**-0.04**	**0.06**	0.02	0.01	-0.01	**-0.19**	**0.06**	**-0.27**	1.00	
		(0.00)	(0.00)	(0.12)	(0.01)	(0.00)	(0.00)	(0.00)	(0.02)	(0.20)	(0.22)	(0.00)	(0.00)	(0.00)		
(15)	|Abnormal other inv.|	**0.29**	**0.02**	-0.01	**-0.03**	**-0.05**	**0.11**	-0.01	**0.02**	**0.04**	**-0.04**	**-0.04**	**0.04**	**-0.04**	**-0.03**	1.00
		(0.00)	(0.00)	(0.05)	(0.00)	(0.00)	(0.00)	(0.44)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

Table 4.4. Tax Avoidance and Labour Investment

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 1992-2017. Table A.4.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Whole-sample	Over-investment		Under-investment	
VARIABLES	(1) |Abnormal net hire|	(2) |Abnormal net hire|	(3) |Larger abnormal net hire|	(4) |Abnormal net hire|	(5) |Larger abnormal net hire|
Low Cash ETR	**0.0079****	0.0080	0.0027	**0.0055*****	**0.0097*****
	(0.0038)	(0.0067)	(0.0104)	(0.0020)	(0.0033)
Market-to-book	0.0015***	0.0021***	0.0018	0.0000	-0.0002
	(0.0003)	(0.0006)	(0.0015)	(0.0002)	(0.0003)
Size	-0.0035***	-0.0058***	-0.0101***	-0.0017***	-0.0012
	(0.0011)	(0.0018)	(0.0031)	(0.0005)	(0.0008)
Quick ratio	0.0030**	0.0168***	0.0111***	0.0012***	0.0003
	(0.0014)	(0.0026)	(0.0032)	(0.0004)	(0.0005)
Leverage	-0.0254	-0.0264**	-0.0027	0.0074**	0.0121***
	(0.0160)	(0.0132)	(0.0085)	(0.0029)	(0.0025)
Dividend	-0.0200***	-0.0069	0.0182	-0.0031*	-0.0014
	(0.0037)	(0.0067)	(0.0122)	(0.0018)	(0.0029)
CFO volatility	0.0086**	0.0125	0.0117	0.0043**	0.0035
	(0.0042)	(0.0078)	(0.0116)	(0.0021)	(0.0034)
Sales volatility	0.0674***	0.0827***	0.0395	0.0052	-0.0081
	(0.0158)	(0.0249)	(0.0298)	(0.0062)	(0.0087)
PP&E	-0.0231*	-0.0067	-0.0133	-0.0209***	-0.0213**
	(0.0118)	(0.0220)	(0.0368)	(0.0062)	(0.0099)
Institutional ownership	0.0658***	0.0223	-0.0490	0.0083	-0.0242**
	(0.0119)	(0.0217)	(0.0363)	(0.0058)	(0.0098)
Net hire volatility	0.0644***	0.0873***	0.1028***	0.0363***	0.0405***
	(0.0147)	(0.0233)	(0.0303)	(0.0075)	(0.0118)
Labour intensity	-0.7295***	-2.0756***	-4.4076***	0.4412**	0.2206
	(0.2491)	(0.4528)	(0.7862)	(0.1821)	(0.2685)
Unionized labour	-0.3021**	-0.1960	0.3678	0.0609	0.0749
	(0.1494)	(0.2590)	(0.4124)	(0.0867)	(0.1346)
|Abnormal other inv.|	0.4957***	0.6286***	0.6022***	-0.0263***	-0.0209
	(0.0398)	(0.0400)	(0.0413)	(0.0095)	(0.0173)
Observations	17,277	7,054	3,460	10,223	4,893
R-squared	0.1521	0.2327	0.2020	0.0529	0.0530
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Table 4.5. Tax Avoidance and Over- and Under- Labour Investment

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 1992-2017. Table A.4.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Over-investment		Under-investment	
	Over-hiring	Under-firing	Under-hiring	Over-firing
	(1)	(2)	(3)	(4)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Low Cash ETR	0.0093	0.0028	**0.0046*** **	0.0308
	(0.0060)	(0.0849)	(0.0018)	(0.0190)
Market-to-book	0.0019***	0.0047	0.0002	-0.0004
	(0.0005)	(0.0035)	(0.0001)	(0.0009)
Size	-0.0046***	0.0208	-0.0016***	-0.0016
	(0.0015)	(0.0132)	(0.0004)	(0.0038)
Quick ratio	0.0144***	0.1056**	0.0012***	0.0070
	(0.0027)	(0.0417)	(0.0004)	(0.0099)
Leverage	-0.0338**	-0.0604**	-0.0097***	-0.0008
	(0.0137)	(0.0263)	(0.0035)	(0.0045)
Dividend	-0.0047	-0.1226**	-0.0043***	0.0375**
	(0.0057)	(0.0600)	(0.0016)	(0.0173)
CFO volatility	0.0104	0.1094	0.0033*	-0.0005
	(0.0068)	(0.0714)	(0.0019)	(0.0189)
Sales volatility	0.0699***	-0.0700	0.0085	-0.1123**
	(0.0215)	(0.2172)	(0.0062)	(0.0481)
PP&E	-0.0053	0.0479	-0.0174***	-0.0786
	(0.0197)	(0.1772)	(0.0057)	(0.0501)
Institutional ownership	0.0173	0.2681	0.0126**	0.0989**
	(0.0187)	(0.1993)	(0.0051)	(0.0432)
Net hire volatility	0.0979***	-0.0054	0.0354***	0.0028
	(0.0198)	(0.1764)	(0.0073)	(0.0675)
Labour intensity	-1.3774***	-10.4266**	0.4647**	-0.3861
	(0.4090)	(4.3664)	(0.1815)	(1.6137)
Unionized labour	-0.1170	-2.8784	0.0692	0.1851
	(0.2258)	(3.7010)	(0.0783)	(0.8535)
|Abnormal other inv.|	0.5581***	0.6899***	-0.0186**	-0.0080
	(0.0322)	(0.2236)	(0.0089)	(0.0775)
Observations	6,742	312	9,732	491
R-squared	0.2302	0.6221	0.0660	0.2655
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 4.6. The Role of Tax Risk and Uncertainty

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 1992-2017. Table A.4.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Over-investment		Under-investment	
	Tax risk=1	Tax uncertainty=1	Tax risk=1	Tax uncertainty =1
	(1)	(2)	(3)	(4)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Low Cash ETR	0.0121	0.0076	**0.0057***	**0.0089****
	(0.0105)	(0.0116)	(0.0031)	(0.0043)
Market-to-book	0.0012	0.0004	0.0005*	0.0002
	(0.0015)	(0.0011)	(0.0003)	(0.0003)
Size	-0.0069**	-0.0066*	-0.0020***	-0.0009
	(0.0028)	(0.0036)	(0.0007)	(0.0014)
Quick ratio	0.0161***	0.0066*	0.0013**	0.0017
	(0.0042)	(0.0036)	(0.0006)	(0.0010)
Leverage	-0.0619**	-0.0580*	0.0099	0.0075
	(0.0303)	(0.0320)	(0.0061)	(0.0089)
Dividend	-0.0056	-0.0171	-0.0011	-0.0013
	(0.0085)	(0.0126)	(0.0024)	(0.0037)
CFO volatility	-0.0043	-0.0137	0.0013	0.0022
	(0.0101)	(0.0184)	(0.0028)	(0.0052)
Sales volatility	0.0723*	0.0603**	0.0170*	-0.0017
	(0.0400)	(0.0241)	(0.0089)	(0.0091)
PP&E	-0.0196	-0.0870*	-0.0202**	-0.0188
	(0.0276)	(0.0448)	(0.0081)	(0.0143)
Institutional ownership	0.0557	0.0329	0.0062	-0.0241
	(0.0340)	(0.0441)	(0.0080)	(0.0152)
Net hire volatility	0.1290***	0.0370	0.0283***	0.0558***
	(0.0371)	(0.0466)	(0.0095)	(0.0203)
Labour intensity	-2.0636**	-4.4245**	0.4651**	0.2434
	(0.8076)	(1.8727)	(0.2170)	(0.3351)
Unionized labour	-0.3834	-0.7434	-0.0615	-0.3643
	(0.3814)	(1.1894)	(0.1324)	(0.2557)
|Abnormal other inv.|	0.5865***	0.5928***	-0.0181	-0.0290
	(0.0600)	(0.0830)	(0.0132)	(0.0288)
Observations	3,066	1,429	4,937	2,371
R-squared	0.2482	0.2428	0.0517	0.0797
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 4.7. The Role of Skilled Labour and Financial Constraints

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 2003-2017. Subsamples by labour skills (panel A) and financial constraints (panel B). Regressions in panel B exclude Leverage from the control variables. Table A.4.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at industry-year level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Subsamples by labour skills

	Over-investment		Under-investment	
	High skills	Low skills	High skills	Low skills
	(1)	(2)	(3)	(4)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Low Cash ETR	-0.0061	-0.0054	**0.0144***	0.0011
	(0.0183)	(0.0176)	(0.0082)	(0.0058)
Observations	729	680	1,107	1,070
R-squared	0.3946	0.2549	0.0783	0.0791
Controls				
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Panel B. Subsamples by financial constraints

	Over-investment		Under-investment	
	Financially unconstrained	Financially constrained	Financially unconstrained	Financially constrained
	(1)	(2)	(3)	(4)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Low Cash ETR	0.0014	0.0093	**0.0053***	**0.0071****
	(0.0080)	(0.0110)	(0.0029)	(0.0029)
Observations	3,737	3,317	5,031	5,192
R-squared	0.2155	0.2746	0.0582	0.0597
Other controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 4.8. DID Regressions around Ireland's Statutory Corporate Tax Cut

Difference-in-differences around Ireland's statutory corporate tax cut occurred in December 1997 (two-year window). The treatment group includes U.S. multinationals with operations in Ireland whereas the control group consists of U.S. multinationals without operations in Ireland. Table A.4.1 in the Appendix reports variable definitions. Firms in the control group are selected using propensity score matching with replacement that best matches each firm in the treatment group based on several lagged (two-year) variables (Cash ETR, Market-to-book value, Size, PP&E, Global pre-tax income and Foreign-only pre-tax income) and industry characteristics. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Whole sample	Over-investment	Under-investment
	(1)	(2)	(3)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Treated × Post	0.0211	0.0620	**0.0278****
	(0.0252)	(0.0403)	(0.0123)
Treated	0.0085	0.0045	-0.0163**
	(0.0234)	(0.0343)	(0.0075)
Post	0.0305	0.0958**	-0.0179
	(0.0251)	(0.0411)	(0.0118)
Observations	1,876	1,105	771
R-squared	0.0944	0.1725	0.0695
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Table 4.9. Controlling for Tax Incentives to Labour in U.S. Domestic Firms Only

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. domestic firms only. The sample excludes utility and financial firms and covers the years 1992-2017. All the explanatory variables are lagged by one year. All regressions include industry and year fixed effects. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Whole sample	Over-investment	Under-investment
	(1)	(2)	(3)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Low peer-adjusted Cash ETR	0.0047	-0.0014	**0.0073****
	(0.0069)	(0.0124)	(0.0035)
Market-to-book	0.0016	0.0018	-0.0001
	(0.0014)	(0.0028)	(0.0003)
Size	-0.0028	-0.0062*	-0.0013
	(0.0019)	(0.0034)	(0.0009)
Quick ratio	0.0027*	0.0199***	0.0014***
	(0.0015)	(0.0036)	(0.0005)
Leverage	-0.0136	-0.0187	0.0081***
	(0.0130)	(0.0117)	(0.0029)
Dividend	-0.0154**	0.0102	-0.0040
	(0.0071)	(0.0139)	(0.0032)
Cash flow volatility	0.0171**	0.0277*	0.0090***
	(0.0077)	(0.0148)	(0.0032)
Sales volatility	0.0684***	0.1004**	-0.0053
	(0.0260)	(0.0464)	(0.0108)
PP&E	-0.0186	-0.0023	-0.0126
	(0.0193)	(0.0344)	(0.0093)
Institutional ownership	0.0770***	0.0165	0.0210*
	(0.0234)	(0.0435)	(0.0110)
Net hire volatility	0.0620**	0.0992**	0.0335**
	(0.0282)	(0.0447)	(0.0141)
Labour intensity	-0.6655*	-2.0233***	0.4820*
	(0.3438)	(0.5593)	(0.2670)
Unionized labour	-0.4272	-0.5372	0.0964
	(0.2639)	(0.4856)	(0.1548)
|Abnormal other inv.|	0.4527***	0.6671***	-0.0542***
	(0.0695)	(0.0730)	(0.0151)
Observations	5,310	2,136	3,174
R-squared	0.1438	0.2630	0.0930
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Table 4.10. Alternative Proxies for Expected Net Hiring

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 1992-2017. All the explanatory variables are lagged by one year. All regressions include industry and year fixed effects. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Panel A. Industry-median net hiring

	Whole-sample	Over-investment	Under-investment
	(1)	(2)	(3)
VARIABLES	|Abnormal ind. adj. net hire|	|Abnormal ind. adj. net hire|	|Abnormal ind. adj. net hire|
Low Cash ETR	**0.0071***	0.0061	**0.0061****
	(0.0037)	(0.0056)	(0.0029)
Market-to-book	0.0012***	0.0017***	-0.0002
	(0.0003)	(0.0005)	(0.0002)
Size	-0.0035***	-0.0049***	-0.0020***
	(0.0010)	(0.0014)	(0.0006)
Quick ratio	0.0031**	0.0040**	0.0007
	(0.0012)	(0.0018)	(0.0005)
Leverage	-0.0184	-0.0291**	0.0100***
	(0.0130)	(0.0132)	(0.0028)
Dividend	-0.0143***	-0.0139***	-0.0001
	(0.0035)	(0.0052)	(0.0026)
CFO volatility	0.0077*	0.0079	0.0026
	(0.0041)	(0.0064)	(0.0031)
Sales volatility	0.0576***	0.0731***	0.0022
	(0.0144)	(0.0195)	(0.0087)
PP&E	-0.0244**	-0.0211	-0.0266***
	(0.0112)	(0.0172)	(0.0086)
Institutional ownership	0.0411***	0.0203	-0.0149*
	(0.0111)	(0.0162)	(0.0079)
Net hire volatility	0.0622***	0.0682***	0.0462***
	(0.0141)	(0.0194)	(0.0103)
Labour intensity	-0.6966***	-1.7073***	0.5124**
	(0.2400)	(0.3437)	(0.2578)
Unionized labour	-0.2148	-0.2176	-0.0185
	(0.1408)	(0.2159)	(0.1146)
|Abnormal other inv.|	0.4833***	0.6162***	-0.0210*
	(0.0382)	(0.0375)	(0.0114)
Observations	17,277	9,680	7,106
R-squared	0.1416	0.1883	0.0523
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Panel B. Three-year average net hiring

	Whole-sample	Over-investment	Under-investment
	(1)	(2)	(3)
VARIABLES	|Abnormal av. net hire|	|Abnormal av. net hire|	|Abnormal av. net hire|
Low Cash ETR	0.0063	0.0060	**0.0127*** **
	(0.0042)	(0.0061)	(0.0046)
Market-to-book	0.0004	0.0004	0.0004
	(0.0004)	(0.0006)	(0.0003)
Size	-0.0034***	-0.0069***	-0.0015
	(0.0012)	(0.0016)	(0.0011)
Quick ratio	-0.0002	0.0028	-0.0025***
	(0.0011)	(0.0018)	(0.0008)
Leverage	-0.0099	-0.0291**	0.0251**
	(0.0086)	(0.0119)	(0.0103)
Dividend	-0.0030	0.0004	-0.0104***
	(0.0040)	(0.0061)	(0.0039)
CFO volatility	0.0025	0.0073	-0.0050
	(0.0051)	(0.0081)	(0.0057)
Sales volatility	0.0555**	0.0278	0.1175***
	(0.0222)	(0.0285)	(0.0276)
PP&E	-0.0336***	-0.0245	-0.0318**
	(0.0129)	(0.0201)	(0.0137)
Institutional ownership	0.0376***	0.0018	0.0039
	(0.0122)	(0.0176)	(0.0119)
Net hire volatility	0.2478***	0.1243***	0.3234***
	(0.0216)	(0.0315)	(0.0210)
Labour intensity	-0.5157*	-2.4728***	0.6894*
	(0.3084)	(0.4593)	(0.3689)
Unionized labour	-0.5564***	-0.0738	0.5523**
	(0.2035)	(0.2651)	(0.2181)
|Abnormal other inv.|	0.3721***	0.6184***	0.0412
	(0.0407)	(0.0437)	(0.0275)
Observations	17,065	7,125	8,770
R-squared	0.1443	0.1954	0.2129
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Table 4.11. Other Robustness Tests

Regressions of labour investment on corporate tax avoidance using longitudinal data on U.S. non-financial and non-utility firms covering the years 1992-2017. All regressions include model (2)' control variables and industry and year fixed effects. Table A.4.1 in the Appendix reports variable definitions. All the explanatory variables are lagged by one year. Standard errors are robust to heteroscedasticity and adjusted for clusters at firm-level (in parentheses). ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

	Whole sample	Over-investment	Under-investment
	(1)	(2)	(3)
VARIABLES	|Abnormal net hire|	|Abnormal net hire|	|Abnormal net hire|
Panel A. Tercile distribution of Cash ETR			
Low Cash ETR tercile	**0.0079****	0.0080	**0.0055*****
	(0.0038)	(0.0067)	(0.0020)
Observations	17,277	7,054	10,223
R-squared	0.1521	0.2327	0.0529
Panel B. Controlling for net operating loss carry-forward			
Low Cash ETR	**0.0084****	0.0065	**0.0058*****
	(0.0037)	(0.0066)	(0.0021)
NOL	0.0007	-0.0042	0.0021
	(0.0033)	(0.0059)	(0.0017)
Δ NOL	-0.0024	0.0078	0.0037**
	(0.0037)	(0.0177)	(0.0017)
Observations	16,390	6,647	9,743
R-squared	0.1529	0.2319	0.0520
Panel C. Excluding labour policy changes in contiguous years			
Low Cash ETR	**0.0096****	0.0080	**0.0079*****
	(0.0047)	(0.0067)	(0.0027)
Observations	13,610	7,054	6,556
R-squared	0.1803	0.2327	0.0553
Panel D. Excluding financial crisis period (2007-2009)			
Low Cash ETR	**0.0076***	0.0072	**0.0064*****
	(0.0041)	(0.0072)	(0.0022)
Observations	14,706	6,179	8,527
R-squared	0.1546	0.2330	0.0528
Panel E. Sub-sample of firms with high staff cost			
Low Cash ETR	0.0057	0.0056	**0.0048****
	(0.0040)	(0.0069)	(0.0022)
Observations	15,856	6,566	9,290
R-squared	0.1565	0.2379	0.0548

FIGURES

Figure 4.1. Net Hiring and Abnormal Net Hiring

Figure A shows net hiring and abnormal net hiring based on economic fundamentals. The blue line in the middle of the graph represents the annual average Net hire. The red (green) line at the top (bottom) represents net hiring above (below) its expected level. All variables are as defined in Table A.4.1.

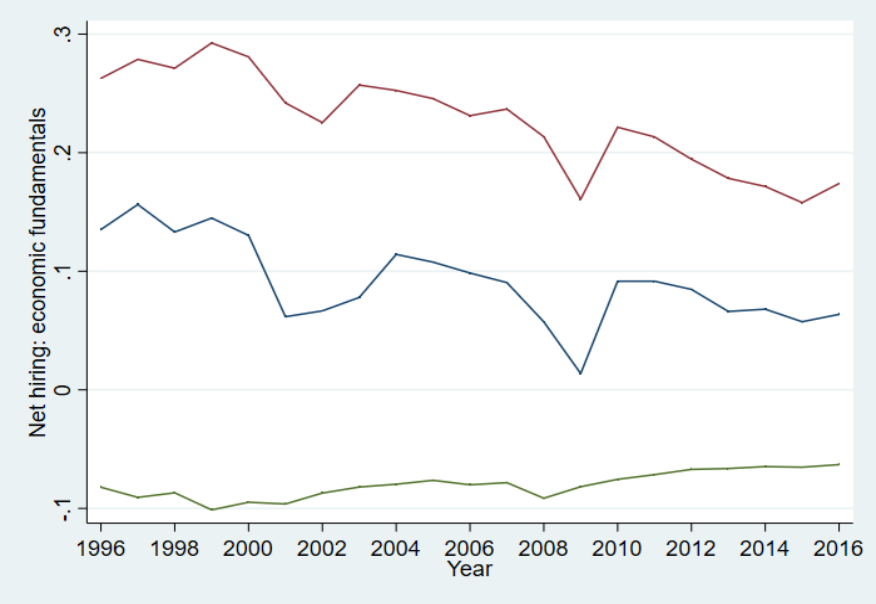

Figure 4.2. Ireland's Statutory Corporate Tax Cut: Treatment and Control Groups

Figure 4.2 shows the annual average Cash ETR for U.S. multinationals with operations in Ireland (Treated = 1) represented by the blue lower line and the annual average Cash ETR for U.S. multinationals with foreign operations in countries other than Ireland (Treated = 0) represented by the red top line. The phased reduction of Ireland's statutory corporate tax rate was approved in December 1997 and entered into force in January 1, 1998 (red vertical line).

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Chapter 5

Conclusion

5.1 Concluding remarks

The last two decades have witnessed a substantial increase in equity holdings by institutional investors. Institutions, such as pensions and insurance companies, investment advisors and banks, hedge funds and mutual funds, represent an important source of capital and are among the largest shareholders of publicly listed companies around the world. Most importantly, institutional investors play a central role in corporate governance. Their active monitoring and the threat of their exit can discipline corporate management to act in a way that maximizes shareholders' value. Chapters 2 and 3 of this doctoral thesis investigate the effect of different types of institutional investors on corporate decision-making.

Chapter 2 focuses on the monitoring impact of foreign institutional investors, as opposed to their domestic counterparts, on corporate tax planning. If foreign institutions are profit-maximizers, they would forego the risks of reputational loss, payments of additional taxes, penalties and interests if the tax strategy is later considered abusive and adopt a more aggressive tax avoidance approach to boost short-term after-tax earnings. The proponents of this view argue that foreign institutional investors could prompt corporate managers to prioritize short-term earnings over long-term growth, thereby leading companies to short-terminist strategies.

Foreign institutional investors may, however, favour a more balanced tax planning approach that trades-off costs and benefits of tax avoidance. Foreign institutions are better positioned to act as effective monitors of managerial decisions in their investee firms. They can undertake a more independent monitoring activity because their ties with local business actors, such as managers, governmental authorities and communities, are likely lower relative to their domestic counterparts. Results of chapter 2 are consistent with the latter hypothesis. They provide evidence that foreign institutions act as effective monitors by leading corporate management to select a tax

avoidance level that is similar to the tax position of a company's peers and is less likely attract regulatory and public scrutiny because it does not stand out from peer levels. Results also show that this effect is more pronounced for larger companies, pointing to a political cost interpretation of my findings.

Chapter 3 investigates the role played by passive, index-tracking institutional investors on transparency and information production of firms' geographic operations. Some studies claim that this class of investors exert limited monitoring over corporate management because their portfolios include a large number of companies and their resources available for monitoring are scarce. In contrast, other studies consider indexed institutions as active owners. According to this latter stance, indexed institutional investors have the incentive to undertake active monitoring over managerial decisions due to their long-term investment horizons, which is linked to index reconstitutions. Results in chapter 3 indicate that institutional ownership is associated with greater transparency and information production of companies' geographic operations. Most importantly, chapter 3 shows that larger shares of ownership by indexed institutions are associated with greater geographic transparency only in companies that lead the majority of their operations in tax haven countries and have more entrenched corporate managers. This result is consistent with a view of indexed investors trading off costs and benefits of monitoring by acting as effective monitors, selectively, in those companies that are more exposed to information asymmetries and governance problems.

Besides external sources of financing, companies can use internally generated funds to finance their activities. One way companies can generate capital internally is by taking advantage of tax planning opportunities. Reducing tax payments leads to higher tax savings and, presumably, to larger cash balances. Yet, companies engaging in tax avoidance incur the risks of reputational loss, additional payments of taxes, interests and penalties if the chosen tax strategy is later ruled improper. On this spirit, chapter 4 examines the relation between tax avoidance and firms' labour investments. Consistent with risks and uncertainties from tax avoidance making firms more cautious in their investments, chapter 4 provides evidence that firms with low effective tax rates, my proxy for tax avoidance, undertake sub-optimal labour investments relative to the level justified by the firms' underlying economic fundamentals and industry medians. More importantly, results are more pronounced in sub-samples of firms exposed to

greater tax risks and uncertainties, which is consistent with the view of firms withholding their hiring decisions in response to potential reductions in cash flows and shareholders' wealth.

5.2 Avenues for future research

There are several potential avenues for future research in the intersection between corporate finance and accounting literatures. A first, relatively unexpected area of research concerns the effect of taxes on investors' portfolio composition. For example, anecdotal evidence suggests that many asset managers domicile funds in low-tax countries, such as Ireland and Luxembourg, but manage them from financial centres, such as New York or London. From an academic perspective, such a study could increase our understanding of the agency relation between institutional investors and their clients. From a more practice-oriented perspective, this study could shade lights on one specific determinant of international money flows and could be also of interest for policy makers and regulators when designing tax incentives to financial investments.

A second research study could examine whether institutions, such as mutual funds and pension funds, make tax-efficient investment decisions by taking advantage of tax-favoured ETFs (Exchange-Traded-Funds) and fixed income securities. This study could focus on tax as one of the causes of the fast growing ETF and fixed income markets and explore the wealth effects of such investments for institutional investors' clienteles. The tax benefits of ETF and fixed income investing have not been investigated by the accounting and finance literatures. Yet, this area of research could increase understanding of the mechanisms that lead institutions to buy ETFs and fixed income securities and allow an investigation of the agency relationship between institutional investors and their clientele.

Finally, a third research study could examine the consequences of corporate tax avoidance on firms' decision-making and focus, in particular, on investing and financing decisions. On this spirit, an empirical question that needs to be addressed is how tax aggressive companies make use of the extra cash generated by tax avoidance activities. A study providing insights into the investing and financing behaviour of companies engaging in tax avoidance could address an important gap in the extant literature and have substantial implications for policy-makers and regulators. Overall,

there are several avenues for research in the intersection between tax, corporate governance and finance which can be explored to increase our understanding of the world and improve decision-making.